

DRAFT

**COMPREHENSIVE PHASE I SAMPLING
SUMMARY REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place

Suite 2-300

3058 West Grand Boulevard

Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.

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Suite 100

Okemos, Michigan 48864

February 2004

W.O. No: 20083.028.001

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EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off site soil sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. The project consisted of evaluating off site soil conditions near 10 facilities in the Detroit Metropolitan Area, which had been identified as potential lead smelters. Sampling was conducted on City and State owned properties in the vicinity of the 10 facilities during November and December 2003. During this time 204 samples were collected from 91 properties and locations.

Lead concentrations on properties in the vicinity of the facilities were evaluated against predominant atmospheric conditions, statistical analysis, and spatial distribution to determine if the lead found was indicative of aerial deposition from the historic smelting operations at the facilities. Review of the data supported the conclusion that one of two conditions existed for the facilities investigated under this phase. They are as follows:

- Level 1 – Samples exceeding the screening level were identified downwind, with a clearly defined trend of decreasing concentration with increased distance from the Facility that is representative of aerial deposition.
- Level 2 –
 - Samples either did not exceed the screening level downwind, but suggest a trend of decreasing concentration with increased distance from the Facility that may be representative of aerial deposition, or
 - Samples downwind indicate no characteristics of aerial deposition but contain concentrations of lead above the screening level.

Recommendations for additional work to be performed under Phase II activities includes:

Level 1

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Site operations;
 - Perform a Site walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

Level 2

- Collect soil samples from additional downwind properties to further investigate the potential for contamination above the screening level downwind of the Facility;
- If the results of the additional off-site property sampling support the conclusion that downwind deposition did occur, then continue with the Level 1 activities.
- If the results of the additional off-site property sampling do not support the conclusion that downwind deposition did occur, additional evaluations may be conducted consistent with the data obtained.

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- Appendix G** Detroit Lead Pipe Works Phase I Summary Report
- Appendix H** Wolverine White Metal Phase I Summary Report
- Appendix I** City Metals Refining Phase I Summary Report
- Appendix J** Aetna Smelting Phase I Summary Report
- Appendix K** Wind Rose Plot

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site soil sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. The project consisted of evaluating off-site soil conditions near 10 facilities in the Detroit Metropolitan Area, which had been identified as potential lead smelters. The facilities investigated were:

- 1) Michigan Smelting – 7885 Joseph Campau Street;
- 2) Great Lakes Smelting – 1640 East Euclid Street;
- 3) Acme Metal Company – 1436 Holbrook Street;
- 4) Industrial Smelting – 19430 Mt. Elliot Street;
- 5) Continental Metal Company- 11500 Russell Street;
- 6) Federated Metals Division – 11630 Russell Street;
- 7) Detroit Lead Pipe Works – 7001 Lyndon Street;
- 8) Wolverine White Metal – 3421 Gibson Street;
- 9) City Metals Refining – 2945 Hubbard Street; and
- 10) Aetna Smelting – 1826 Illinois Street.

The project is being conducted using a phased approach. Phase I, which were addressed in this report, consists of an initial evaluation of each site, as described below. Additional phases may be required based on the Phase I findings. Lead concentrations if identified on properties in the vicinity of the facilities was evaluated against predominant atmospheric conditions, statistical analysis, and spatial distribution to determine if the lead found was indicative of aerial deposition from the historic smelting operations at the facilities.

The initial project tasks at each location consisted of the collection of soil samples from upwind and downwind parcels located within approximately 1,000 feet (ft.) of each Facility. Originally, the scope of work called for soil sample collection from four upwind and six downwind parcels. Following a meeting with the MDEQ regarding statistical use of the resulting data prior to the

sampling event, the number of upwind parcels was revised to include six parcels. WESTON collected two composite samples from each parcel.

1.1 SAMPLING OBJECTIVES

The primary objective of the sampling was to characterize the off-site soil in the vicinity of the facilities. WESTON's methods, and conclusions of the historical data review, are included in the report entitled "*Summary Report for Data Investigation*" dated September 2003. Soil characterization of off-site soils at properties located within approximately 1,000 ft. of the facilities was an initial step in evaluating the potential impact of possible former smelting operations on neighboring areas located within expected depositional areas. Soil samples were collected from state and/or city owned properties upwind and downwind to further evaluate the presence of a smelter-related release. All samples were analyzed for lead using United States Environmental Protection Agency (U.S. EPA) Method 6010B.

1.2 SAMPLING REPORT FORMAT

This Comprehensive Sampling Summary Report (Report) has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Field Activities and Procedures, and
- **Section 3** – Conclusions and Recommendations.

Appendices to this Report include the following:

- **Appendix A** – Michigan Smelting Phase I Summary Report,
- **Appendix B** – Great Lakes Smelting Phase I Summary Report,
- **Appendix C** – Acme Metal Company Phase I Summary Report,
- **Appendix D** – Industrial Smelting Phase I Summary Report,
- **Appendix E** – Continental Metal Company Phase I Summary Report,

- **Appendix F** – Federated Metals Division Phase I Summary Report,
- **Appendix G** – Detroit Lead Pipe Works Phase I Summary Report,
- **Appendix H** – Wolverine White Metal Phase I Summary Report,
- **Appendix I** – City Metals Refining Phase I Summary Report,
- **Appendix J** – Aetna Smelting Phase I Summary Report, and
- **Appendix K** – Wind Rose Plot.

SECTION 2

FIELD ACTIVITIES AND PROCEDURES

2.1 OVERVIEW OF SAMPLING ACTIVITIES

Experience with previous lead investigations indicated that if lead concentrations were present from aerial deposition, they would be detected within a 1,000 foot to 1,500 foot radius of the facilities. Soil samples were to be collected from city and/or state owned properties within approximately 1,000 ft. of each Facility. However, due to various circumstances (development around facilities, lack of state or city owned properties), samples could not always be collected within the 1,000 foot radius stated in the Phase I Quality Assurance Sampling Plan for Detroit Lead Assessment Project, dated October 2003 (QASP). Variances are described for each Facility in their respective summary reports contained in **Appendices A** through **K**. Prior to sample collection, upwind and downwind sampling areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Appendix K**. Soil samples were collected from city and/or state owned properties located within these established areas.

The city or state owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the former smelting facilities. Where individual city or state owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included with each individual summary report. Photographs of the sampling locations are also included in the reports. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

All properties sampled were inspected and divided into exposure units of approximately 500 square feet in area. Soil samples were collected at random locations within the units. On vacant parcels where it was apparent that a house had previously existed, the units were selected from an area in front of where the porch would have been located, and an area in back of where the house would have been located. Houses on surrounding parcels were used to estimate the former house location. Samples were not to be collected within a 5 foot buffer from house drip lines or

within a 5 foot buffer of any painted structure or from locations where flaked paint or visibly stained soil existed. Greenways samples were collected from the furthest practicable point from the curb line to avoid contamination from vehicle exhaust. All samples from each exposure unit were composited in the field and were analyzed for lead using U.S. EPA Method 6010B.

For all sample locations, the WESTON lead sampler selected random sample locations based on a random number generation system; collected samples; logged the activities at each sample location in the field logbook; and verified the sample documentation. Sample documentation and preparation was the responsibility of WESTON. Details of soil sample collection methodologies and procedures are provided below.

2.1.1 Sampling Approach

Details regarding the number, type, and locations of the samples related to specific facilities are included in the reports included in **Appendices A** through **J**. Generally, each composite soil sample consisted of five randomly located discrete surface soil samples aliquot (0 to 3 inches below ground surface) of approximately equal volume collected from the sampling unit. All discrete soil sample aliquots were collected from undisturbed areas (i.e., no signs of recent landscaped areas, gardens, etc.). Soil sampling procedures consisted of removing a volume of soil approximately 3 inches in diameter and 3 inches in depth using a pre-cleaned, stainless steel trowel. The soil was placed directly into a large, plastic Ziploc® bag. Foreign material, such as vegetation, large rocks, and pebbles, etc., was removed from the sample and discarded. Following sample collection, the location was restored using the remaining soil and grass was replaced.

During sampling, all information regarding soil description, location, and other distinguishable features present at the sample location were recorded in the field logbook. A field sketch was prepared (on 8.5 inch by 11 inch graph paper) for each exposure unit. Site sketches include all sample locations and their sample number, physical features (sidewalks, building corners, utility poles), measurements between sample points and physical features, and any information necessary to relocate the area (address, street name, etc.). These sample sketches are included in the individual summary reports contained in **Appendices A** through **J**.

Investigative soil samples were designated for matrix spike/matrix spike duplicate (MS/MSD) analysis at a frequency of one per five soil samples. The lead sampler recorded the MS/MSD location in the field logbook and designated it with the appropriate one digit identifier in the sample identification as specified in the QASP. When non-dedicated sample equipment (stainless steel trowels) was used, equipment blanks were collected at a rate of one per sampling team per day to assess the effectiveness of decontamination procedures. Following decontamination the equipment blanks were collected by running distilled water over the stainless steel trowel was used during the sampling event.

2.1.2 Sampling and Sample Handling Procedures

Clean, decontaminated sampling equipment and sample containers were maintained in a clean, segregated area prior to use. Sampling personnel changed gloves between each sample collection/handling to prevent cross contamination. All samples were assembled and catalogued prior to shipping to the designated State Laboratory in Lansing, Michigan. Sample preservation, containers, and hold times for analytical methods associated with this work are presented in **Subsection 2.1.4.**

2.1.3 Decontamination

The non-dedicated sampling equipment (soil samplers, hand trowels, etc.) that were used during sample collection were thoroughly decontaminated before the initial use, between sample locations, and at the end of the field investigation. Equipment decontamination was completed as follows:

- Water spray or brush, if needed, to remove soil/sediment from the equipment;
- Non-phosphate detergent and potable water wash to clean the equipment;
- Final potable water rinse;
- Equipment air dried; and
- Placed in clean and marked bucket.

2.1.4 Sample Preservation, Containers, and Hold Times

After collection, the samples were securely stored in a cooler until they were submitted for analysis. The samples were transmitted to the State Laboratory by WESTON field personnel or a common carrier, typically every other day. Soil and rinsate blank samples were preserved on ice.

2.1.5 Sample Custody Procedures

Due to the evidentiary nature of sample collection, the possession of samples (chain-of-custody) must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. Following sample collection and identification, the samples were maintained under chain-of-custody procedures, as described below.

The chain-of-custody procedures were made available to all personnel involved with the sampling. A typical chain-of-custody record was completed each time a sample or group of samples was prepared for shipment to the State Laboratory. The record repeated the information on each of the sample labels and served as documentation of custody during collection and shipment. A copy of this record remained with the shipped samples at all times, and another copy was retained by the sampling team member that originally relinquished the samples. WESTON personnel completed a chain-of-custody form for all samples sent to the State Laboratory.

2.1.6 Photo Documentation

WESTON took photographs to document Site conditions, sample locations, and the exposure units as they related to adjacent areas. The photographs showed typical operations and operating conditions as well as special situations and conditions that arose during sampling.

All photographs were taken with a digital camera. Each photograph was recorded in the logbook with the location of the photographer, the direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Photographs were labeled using the street abbreviation/street number-exposure unit-and picture number starting at 01 for

each property sampled. The photograph location, direction, and subject were also shown on the sample sketch.

SECTION 3

CONCLUSIONS AND RECOMMENDATIONS

3.1 CONCLUSIONS

Following completion of fieldwork, the analytical data was tabulated and evaluated. The results are summarized in summary reports for each of the 10 facilities (**Appendices A through J**). The analytical results were evaluated to determine if there were patterns of lead concentrations that could be attributable to factors such as atmospheric conditions, land use and wind direction. The analytical results were also compared to the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U.S. EPA Act 1994, as amended. These criteria were developed by the State of Michigan following a risk-based model.

Facilities were reviewed for several factors to determine the potential impact on downwind properties, if any, from the historic smelting operations. Lead concentrations at upwind and downwind properties were reviewed for discernable trends that suggested downwind aerial deposition of lead. The analytical results were also evaluated to determine if the distribution of upwind and downwind lead concentrations were statistically consistent and if the data for the upwind and downwind sampling groups represented differing conditions. Data were evaluated using MDEQ online Statistical software. The data were evaluated for both normal and lognormal distributions. Summary reports for the best fitting distribution were compared and used for reporting mean concentrations and relative frequency distribution (included in **Attachment F** of the individual Summary Reports).

Review of the summary reports supports the conclusion that one of two conditions exist for the facilities investigated under this phase. They are as follows:

- Level 1 – Samples exceeding the screening level were identified downwind, with a clearly defined trend of decreasing concentration with increased distance from the Facility that is representative of aerial deposition.

- Level 2 –
 - Samples either did not exceed the screening level downwind, but suggest a trend of decreasing concentration with increased distance from the Facility that may be representative of aerial deposition, or
 - Samples downwind indicate no characteristics of aerial deposition but contain concentrations of lead above the screening level.

Summary of Findings

Category	Companies								
Level 1	Continental Metal Company Federated Metals Division Michigan Smelting								
Level 2	<table border="0"> <tr> <td>Aetna Smelting</td><td>Great Lakes Smelting</td></tr> <tr> <td>City Metals Refining</td><td>Detroit Lead Pipe Works</td></tr> <tr> <td>Industrial Smelting</td><td>Wolverine White Metal</td></tr> <tr> <td>Acme Metal Company</td><td></td></tr> </table>	Aetna Smelting	Great Lakes Smelting	City Metals Refining	Detroit Lead Pipe Works	Industrial Smelting	Wolverine White Metal	Acme Metal Company	
Aetna Smelting	Great Lakes Smelting								
City Metals Refining	Detroit Lead Pipe Works								
Industrial Smelting	Wolverine White Metal								
Acme Metal Company									

3.2 RECOMMENDATIONS

Based on the findings presented in the summary reports, the recommendations have been broken down into two levels of recommended action. Details of these recommendations are included in the summary reports for each Facility. The recommended Phase II actions are described below:

Level 1

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Facility operations;
 - Perform a Facility walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

Level 2

- Collect soil samples from additional downwind properties to further investigate the potential for contamination above the screening level downwind of the Facility;
- If the results of the additional off-site property sampling support the conclusion that downwind deposition did occur, then continue with the Level 1 activities.
- If the results of the additional off-site property sampling do not support the conclusion that downwind deposition did occur, additional evaluations may be conducted consistent with the data obtained.

Appendix A

Michigan Smelting Phase I Summary Report

DRAFT

**PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
MICHIGAN SMELTING – 7885 JOSEPH CAMPAU STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION**

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EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Michigan Smelting Company (the Facility), 7885 Joseph Campau, Hamtramck, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 5 and 6 November 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. Review of the data concluded that the lead found was consistent with deposition resulting from aerial releases and suggested that such releases occurred during historic smelting operations at the Facility. To address these concerns, it is recommended that the following additional tasks be completed:

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Facility operations;
 - Perform a Facility walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

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LIST OF ATTACHMENTS

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Attachment A	Figures
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Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the project) in Detroit, Wayne County, Michigan. This report addresses work that was conducted in the vicinity of the former Michigan Smelting Property (the Facility), 7885 Joseph Campau Street, Hamtramck, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Phase I Summary Report for Michigan Smelting – 7885 Joseph Campau Street has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations

Attachments to this Summary Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E** – Concentration Graph, and

- **Attachment F** – Statistical Distribution.

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 7885 Joseph Campau Street in Hamtramck, Wayne County, Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the Facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility now appears to be occupied by the Hamtramck General Motors-Cadillac Assembly Plant (GM Assembly Plant). The smelting Facility no longer exists, and has apparently been demolished and replaced with a grassy area surrounding the existing GM Assembly Plant. A fence surrounds the existing GM Assembly Plant. The area immediately to the north of the property is Interstate I-94 (I-94) with residential properties located north of the freeway and extending north for at least the next four blocks. The area immediately south of the property and extending five blocks south is industrial and residential properties, including the existing GM Assembly Plant. The areas immediately east and west of the property are mostly industrial and a part of I-94.

2.1.2 Site History

A review of the Bresser's city directory indicated that Michigan Smelting & Refin owned the property from 1946 to 1951. The property was co-owned by Bohn Alum & Brass Corporation Research Labor in 1946. The address has not been listed in the directory since.

Review of the Sanborn maps for the address showed the following chronology: In 1951 a Stock Warehouse Laboratory was on the property (built in 1915); in 1968 the property was located under a large parking lot; and in 2002 the property was still located under a large parking lot.

A review of aerial photographs indicated that the area in the immediate vicinity of the Facility was industrial from 1957 through 1994. The former smelting Facility has been demolished and a parking lot/grass area is present on the property just south of the GM Assembly Plant. Residential areas exist approximately 900 feet (ft.) east of the property. Observations conducted during the drive by of the property confirmed that the current land use is consistent with that indicated by the aerial photograph and Sanborn maps.

During the investigation of the fire records, no records were found for the property.

Review of the BEA for nearby “1580 East Grand Boulevard”, dated February 1997, prepared by Vision Environmental Inc. for Boulevard Properties L.L.C., indicates that lead was detected on that Site at levels up to 540 mg/kg and exceeded the MDEQ Part 201 Residential Direct Contact Criterion (RDCC).

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter related releases were present off-site and could be attributed to the former Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for the Facility.

Prior to sample collection, upwind and downwind sampling areas were established, 2,800 and 2,300 ft. from the Site, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or state owned properties located within these established areas.

The city or state owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual City or State owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, and photo documentation) were conducted as described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project*. Because no State or City owned parcels were available in the sample radius for the Facility, WESTON collected samples from 9 greenways near the suspected former smelter Facility. Six greenway parcels were sampled in the downwind direction and three greenway parcels were sampled in the upwind direction due to size and availability of the

properties. Two composite samples were collected from each of the six downwind greenways and two of the upwind greenways. Eight composite samples were collected from one larger upwind greenway because it was a larger parcel of land encompassing approximately four average sized parcels. A total of 24 composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky and Ms. Amanda Freeman, conducted field sampling on 5 and 6 November 2003. Since city and/or state owned parcels were not available, WESTON selected greenways, prior to the sampling event, and submitted them to the City of Hamtramck to obtain their approval and access. When greenways were not located on the same street as the mailing address of the nearest building, the number of the building was used in conjunction with the street of the greenway. For example, a house located on 1998 East Grand Boulevard with an adjacent greenway located on Medbury Street, would be identified MED – 01998. These changes were noted in the logbook and can be viewed on the “Summary Table For Sample Properties” (**Attachment B**) and the sample sketches (**Attachment A**).

WESTON collected samples from three upwind greenways: Two composite samples were collected from two of the upwind greenways and eight composite samples were collected from the third larger upwind greenway for a total of 12 upwind samples. Also, two samples were taken from each of the six downwind greenways for a total of 12 downwind samples. Twenty four soil samples were submitted for analysis. Four samples were designated as matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Michigan Smelting Facility project area:

- 12 composite soil samples in the upwind direction, and
- 12 composite soil samples in the downwind direction.

Sample locations from both the upwind and downwind areas are listed in **Table 1** included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. Samples collected from properties upwind of the Facility did not contain concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. Six samples collected from properties downwind of the Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	0	66-360
Downwind	12	6	150-740
Total	24	6	66-740

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were selected based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast

wind direction in the City of Detroit Metropolitan Area. If smelting operations occurred, lead in soils resulting from aerial deposition would be found downwind in the northeast direction from the Facility. Parcels ranging from 1,650 ft. to 2,850 ft. were chosen west in the upwind direction of the Facility. Parcels were not chosen northeast in the major downwind direction due to lack of residential receptors within 3,600 ft. Parcels ranging from 1,350 ft. to 2,250 ft. were chosen southeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. Elevated lead concentrations were found in the downwind direction of the Facility and low-level lead concentrations were found in the upwind direction. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus the Phase I investigation was designed to determine if an off-site airborne release had occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind envelope.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the Facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated consistently low concentrations of lead in the upwind direction and elevated levels of lead in the downwind direction represented as decreasing concentrations with increasing distance from the Facility, a condition that would be expected if an aerial release of lead had occurred due to smelting operations. These conclusions were confirmed by a linear regression of the concentration versus distance data (**Attachment E**).

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet file and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind log mean is 5.9 mg/kg and the upwind log mean is 4.9 mg/kg indicating the data is dissimilar. In addition the relative frequency for the downwind data shows a larger variation across the sample set than the upwind which contains a more even distribution relative to the log normal curve. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data represent separate conditions.

4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility suggests that lead contamination detected in downwind locations may be attributable to historic releases from historic smelting operations at the property. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U.S. EPA Act 1994, as amended.

No samples collected from upwind of the Facility contained concentrations of lead above the 400 mg/kg screening level. The lead that is present at upwind locations is similar in concentration to that detected in the far downwind direction, which could be indicative of background concentration. However, lead concentrations in exceedance of the screening level were detected downwind of the Facility. The downwind samples show a strong trend of decreasing concentration with increasing distance with the highest levels of lead (over 700 mg/kg) closest to the Facility. This pattern of low concentrations of lead upwind and higher concentrations of lead with decreasing concentrations downwind of the Facility is consistent with deposition patterns from aerial releases and suggests that such releases occurred from the Facility during historic smelting operations.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

Based on the evaluation of the Phase I analytical data, it is recommended that additional tasks be completed to further define the existing risk and the origin of the off-site contamination. The determination that additional work is necessary is based on three factors:

- The presence of residential receptors located within approximately 1,800 ft. downwind of the former Facility,
- Concentrations of lead in excess of the Part 201 Direct Contact Criteria screening level downwind of the former Michigan Smelting Facility, and
- The pattern of lead concentrations within the study area suggests a strong potential that soils at downwind properties have been impacted by aerial deposition from releases of lead from historic smelting operations at the former Michigan Smelting Facility.

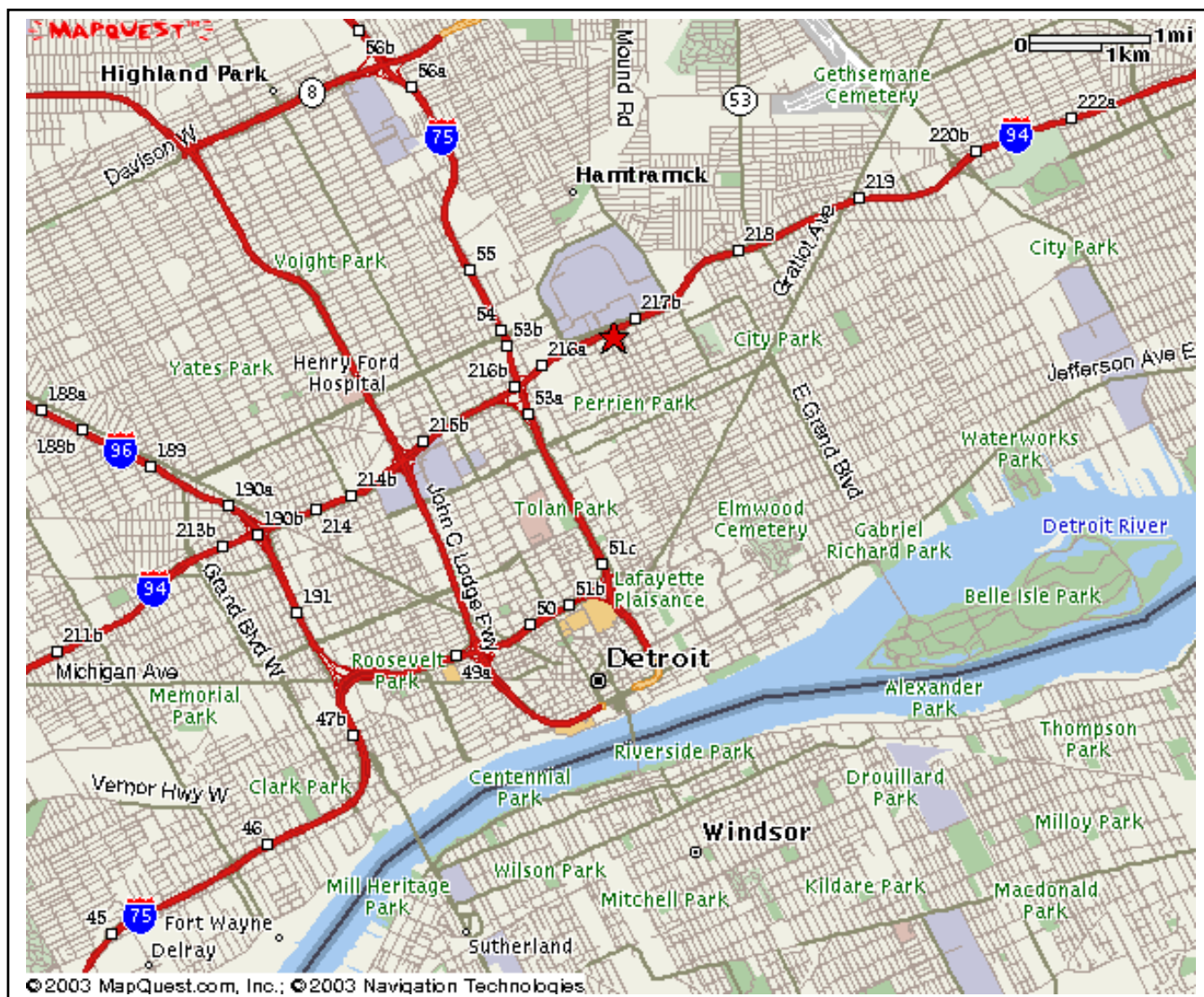
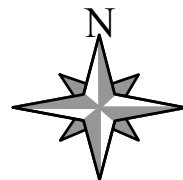
To address these concerns, it is recommended that the following additional tasks be completed:

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Facility operations;
 - Perform a Facility walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
7885 Joseph Campau Street

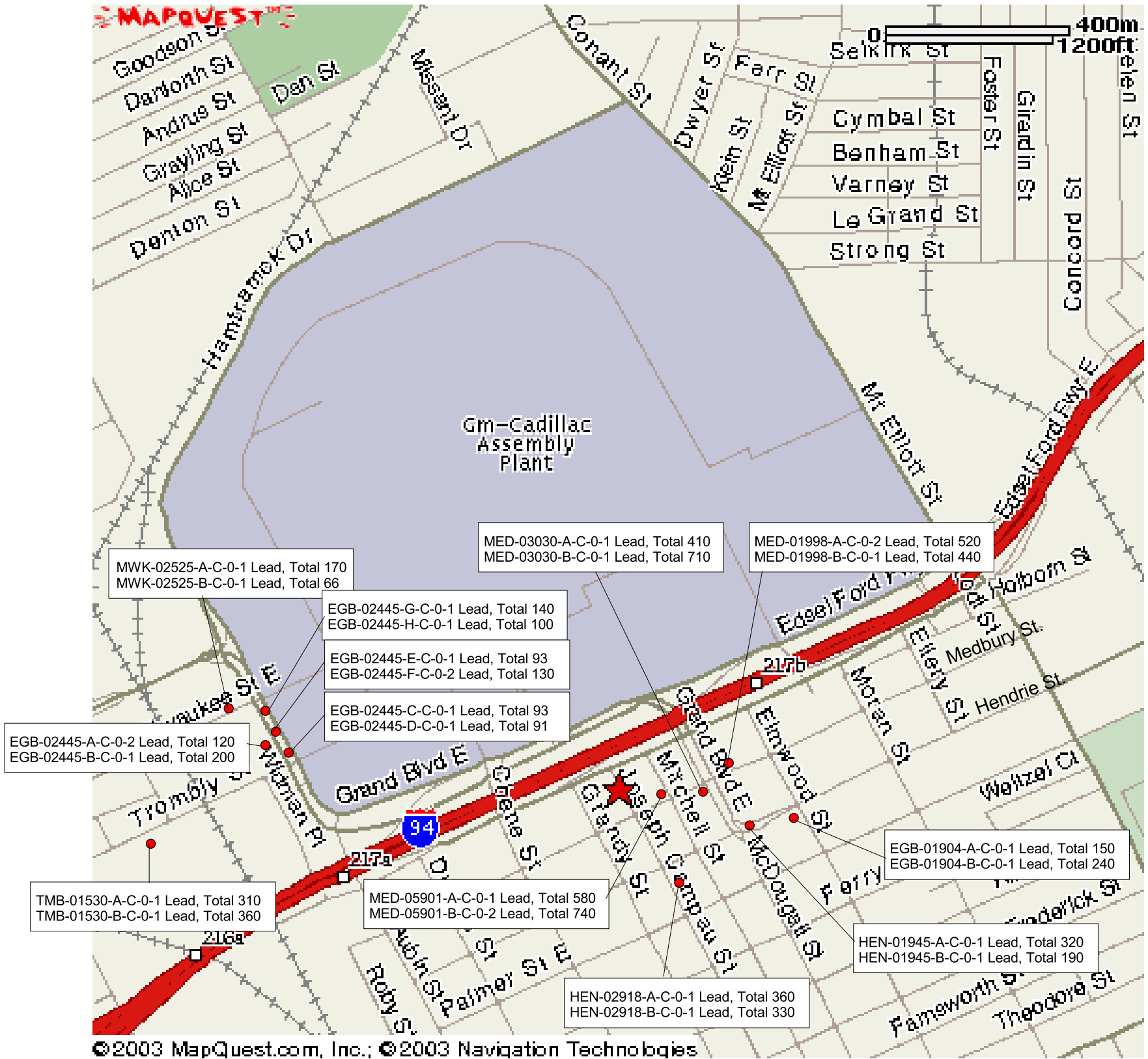


WESTON SOLUTIONS, INC. OF MICHIGAN



**300 River Place, Suite 2800
Detroit, Michigan 48207**

**Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001**



ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
2525 E Grand Blvd	Greenway located to the north side of Milwaukee St and the south side of the Midwest Steel building at 2525 E Grand Blvd.	MWK-02525-A-C-0-1
		MWK-02525-B-C-0-1
1530 Trombly	Greenway located on north side of Trombly St and south side of the DTE Energy building.	TMB-01530-A-C-0-1
		TMB-01530-B-C-0-1
2445 E Grand Blvd	Greenway located on the east side of the Simon and Leeman Fruits & Vegetable Distributor building.	EGB-02445-A-C-0-2
		EGB-02445-B-C-0-1
	Greenway located between the north and south bound lanes of E Grand Blvd across the street and to the east of the Simon and Leeman Fruits & Vegetable Distributor building.	EGB-02445-C-C-0-1
		EGB-02445-D-C-0-1
		EGB-02445-E-C-0-1
		EGB-02445-F-C-0-2
		EGB-02445-G-C-0-1
		EGB-02445-H-C-0-1
Downwind Properties		
Address	Description	Sample Identification
1904 E Grand Blvd	Greenway located on the south side of E Grand Blvd in between an empty lot, a house at 1904 E Grand Blvd, and a parking lot on the corner of Elmwood & E Grand Blvd.	EGB-01904-A-C-0-1
		EGB-01904-B-C-0-1
1998 E Grand Blvd	Greenway located on the north side of Medbury St and to the south side of the house at 1998 E Grand Blvd.	MED-01998-A-C-0-2
		MED-01998-B-C-0-1
3030 Medbury	Greenway located on the south side of Medbury St and to the south side of the house at 3030 Medbury.	MED-03030-A-C-0-1
		MED-03030-B-C-0-1
5901 Mitchell	Greenway located on north side of Medbury St and to the south side of the house at 5901 Mitchell.	MED-05901-A-C-0-1
		MED-05901-B-C-0-2
2918 Hendrie	Greenway located on the south side of Hendrie St and to the north side of church at 2918 Hendrie.	HEN-02918-A-C-0-1
		HEN-02918-B-C-0-1
1945 E Grand Blvd	Greenway located on the south side of Hendrie St and to the north side of the house at 1945 E Grand Blvd & Empty lot (lot directly west of house; house and lot are separated by an alley).	HEN-01945-A-C-0-1
		HEN-01945-B-C-0-1

*Notes: Greenway identifiers were taken from the street the greenways were parallel to and not the actual street to which the property belonged.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
2525 E Grand Blvd	MWK-02525-A-C-0-1	170
2525 E Grand Blvd	MWK-02525-B-C-0-1	66
1530 Trombly	TMB-01530-A-C-0-1	310
1530 Trombly	TMB-01530-B-C-0-1	360
2445 E Grand Blvd	EGB-02445-A-C-0-2	120
2445 E Grand Blvd	EGB-02445-B-C-0-1	200
2445 E Grand Blvd	EGB-02445-C-C-0-1	93
2445 E Grand Blvd	EGB-02445-D-C-0-1	91
2445 E Grand Blvd	EGB-02445-E-C-0-1	93
2445 E Grand Blvd	EGB-02445-F-C-0-2	130
2445 E Grand Blvd	EGB-02445-G-C-0-1	140
2445 E Grand Blvd	EGB-02445-H-C-0-1	100
Downwind		
1904 E Grand Blvd	EGB-01904-A-C-0-1	150
1904 E Grand Blvd	EGB-01904-B-C-0-1	240
1998 E Grand Blvd	MED-01998-A-C-0-2	520
1998 E Grand Blvd	MED-01998-B-C-0-1	440
3030 Medbury	MED-03030-A-C-0-1	410
3030 Medbury	MED-03030-B-C-0-1	710
5901 Mitchell St	MED-05901-A-C-0-1	580
5901 Mitchell St	MED-05901-B-C-0-2	740
2918 Hendrie	HEN-02918-A-C-0-1	360
2918 Hendrie	HEN-02918-B-C-0-1	330
1945 E Grand Blvd	HEN-01945-A-C-0-1	320
1945 E Grand Blvd	HEN-01945-B-C-0-1	190

* Notes

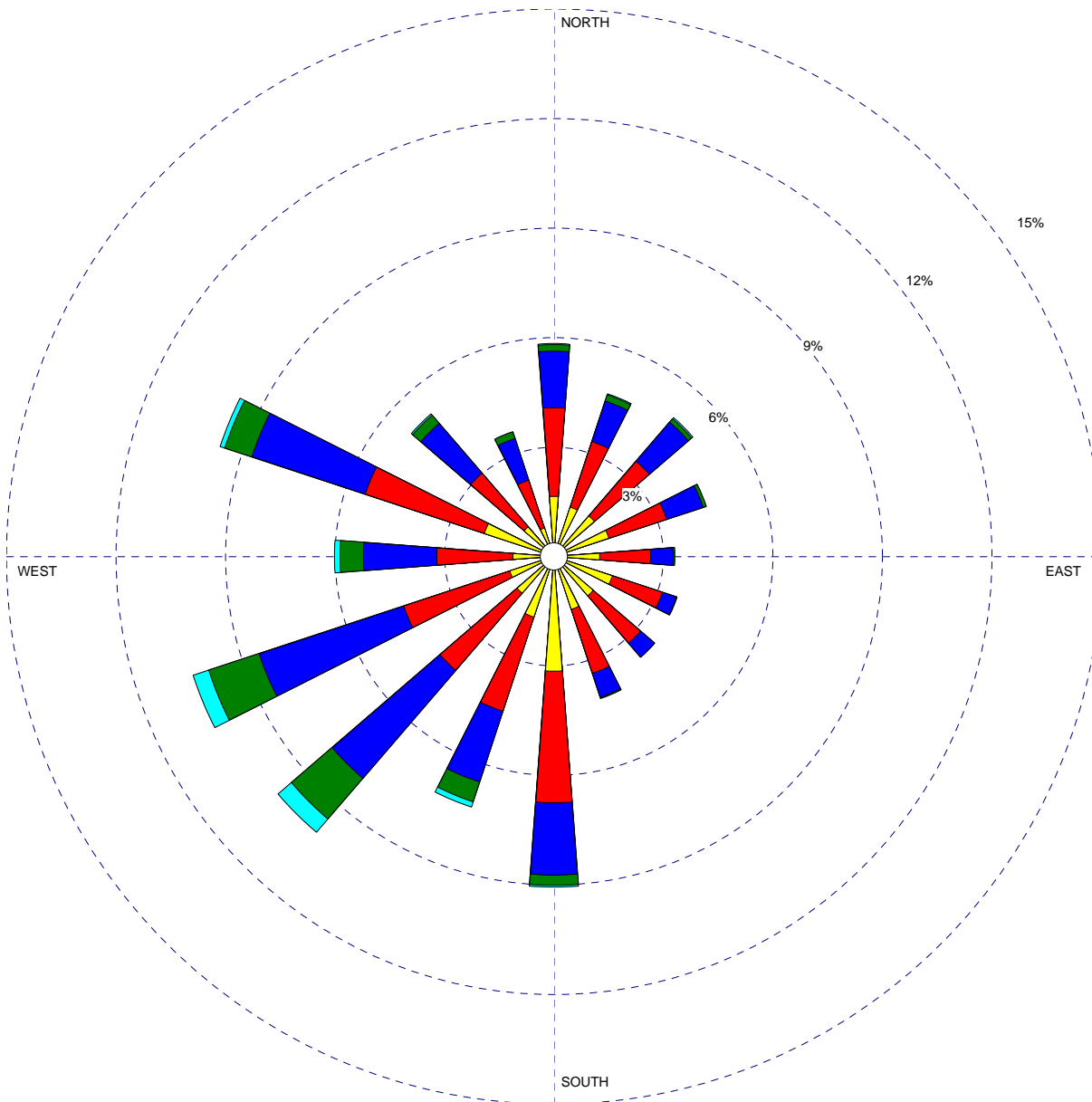
1) Bold indicates results equal to or greater than to 400 mg/kg.

ATTACHMENT C

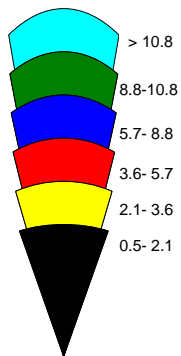
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

CLIENT/SUBJECT DETROIT LEAD ASSESSMENT W.O. NO.

TASK DESCRIPTION MWK-02945 2525 E Grand Blvd Joe Campall TASK NO.

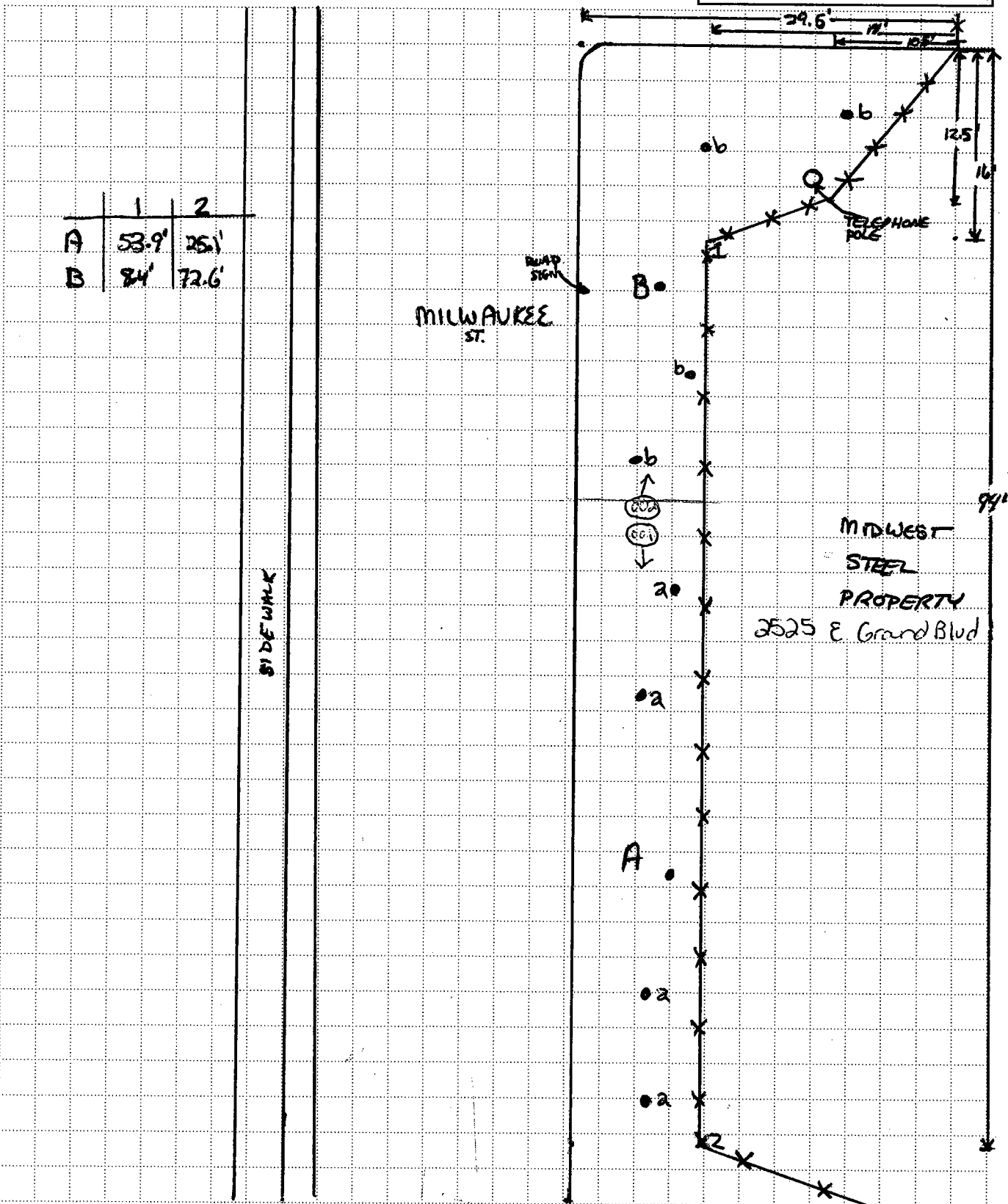
PREPARED BY R. Nemirovsky DEPT DATE 11/05/03

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY	
<div style="border-bottom: 1px solid black; width: 100%;"></div>	
DEPT <u> </u>	DATE <u> </u>

	1	2
A	53.9'	25.1'
B	84'	72.6'



CLIENT/SUBJECT JOE CAMPANI W.O. NO. _____

TASK DESCRIPTION TMB-01530 - A + B TASK NO. _____

PREPARED BY R. NEMIROVSKY DEPT _____ DATE 11/05/03

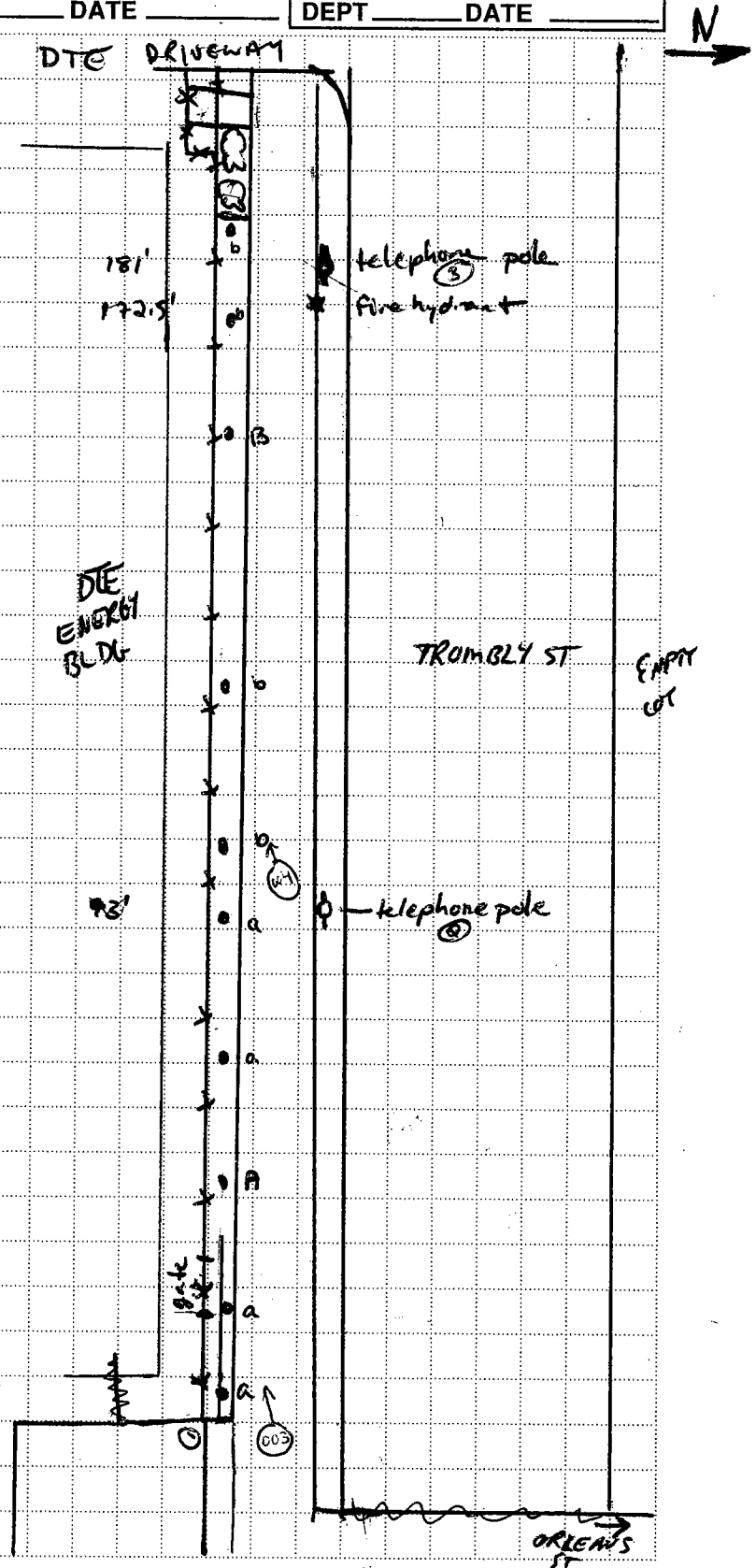
MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____

PT 1 = NW CORNER OF BLDG
 PT 2 = E TELEPHONE POLE
 PT 3 = W TELEPHONE POLE

	1	2	3
A	32.4	46.6	—
B	—	57.6	32



CLIENT/SUBJECT JOE CAMPAN

W.O. NO. _____

TASK DESCRIPTION 2445 E. GRAND AVENUE GREENWAY

A through H
TASK NO. _____

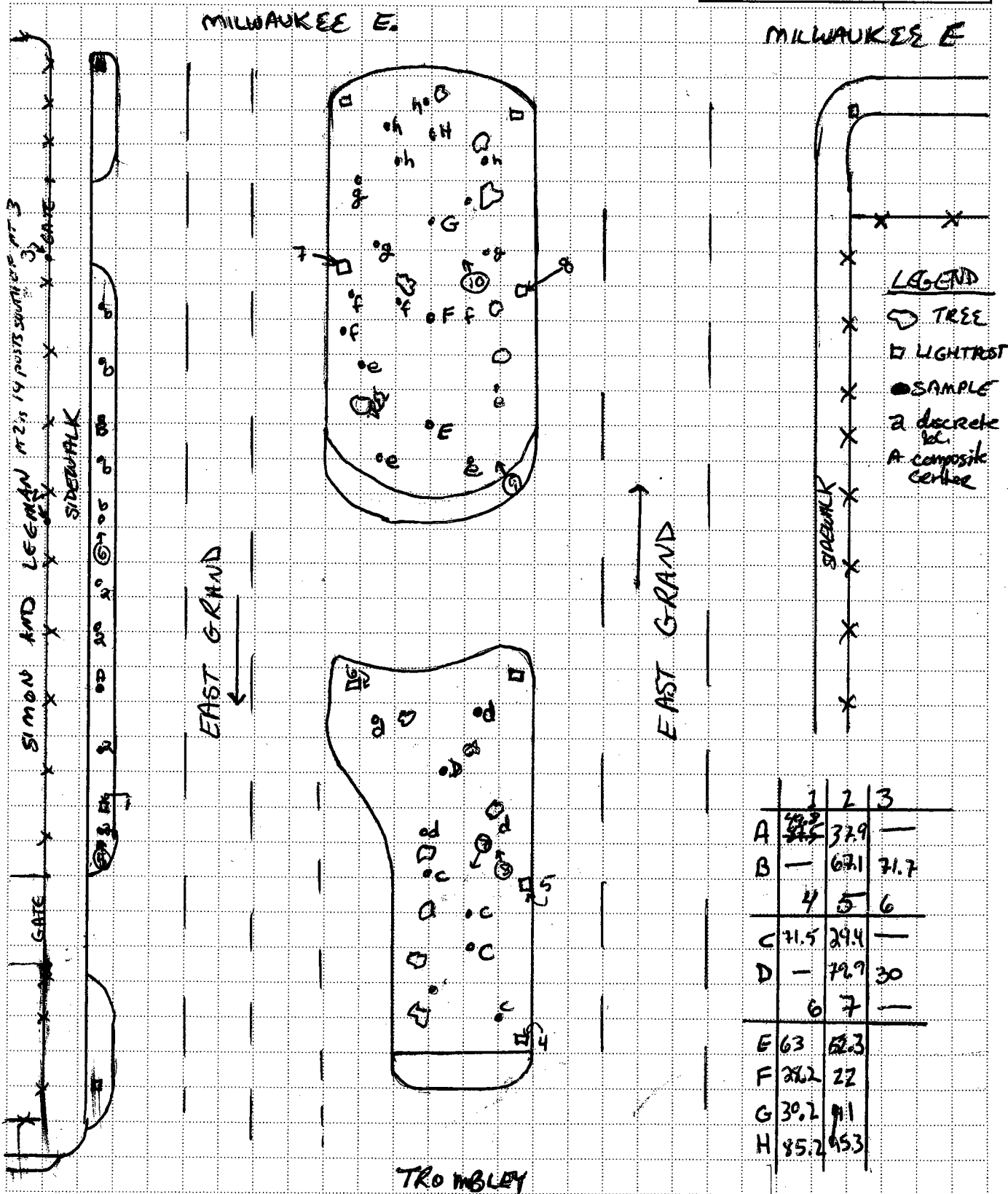
PREPARED BY R. NEMIRWSKY DEPT _____ DATE 11/5/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____

DEPT _____ DATE _____



CLIENT/SUBJECT Joe Campan

W.O. NO. _____

TASK DESCRIPTION EGB-01904 - A & B

TASK NO. _____

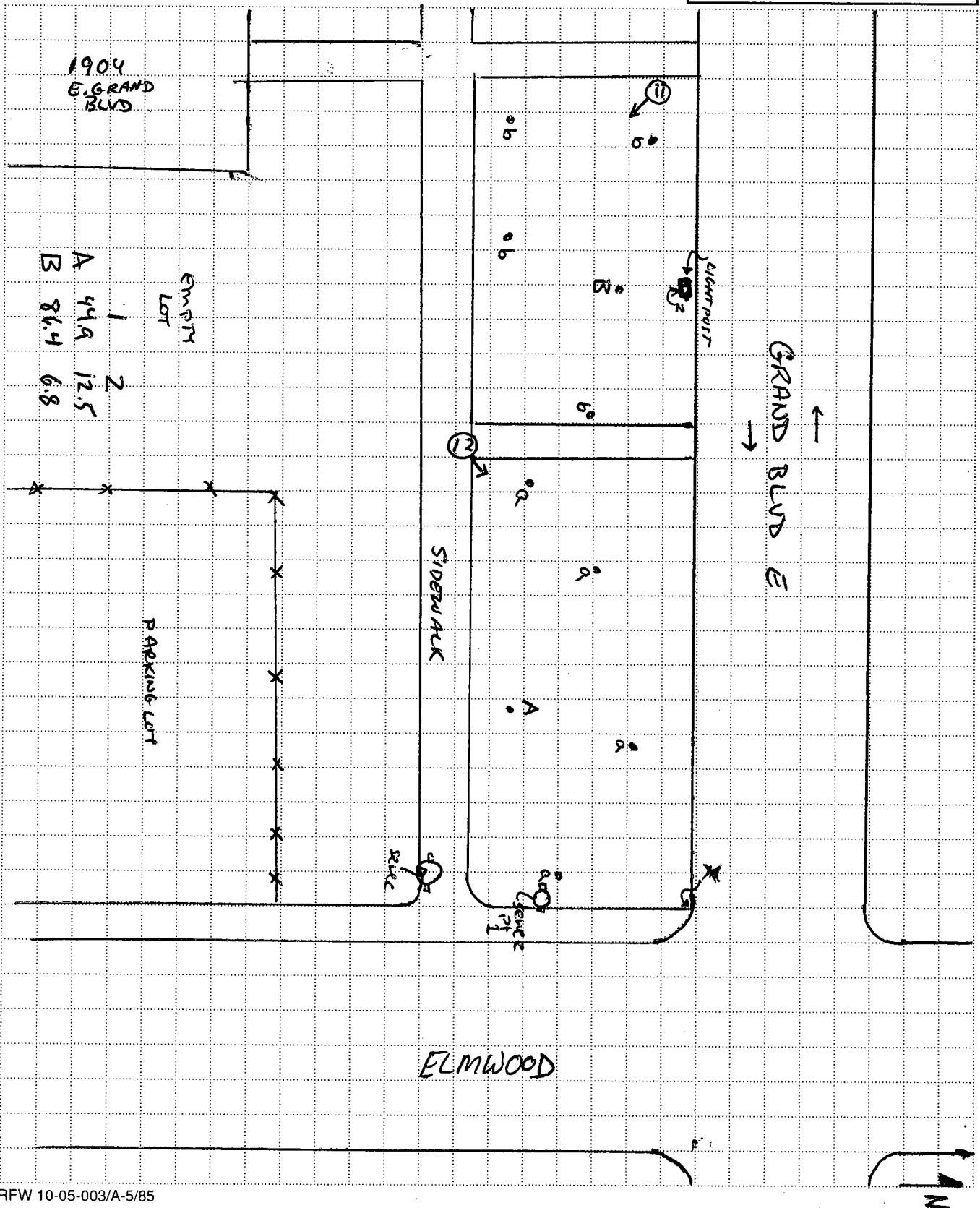
PREPARED BY R. Nemirovsky DEPT _____ DATE 11/05/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____

DEPT _____ DATE _____



CLIENT/SUBJECT Joe Campan W.O. NO. _____

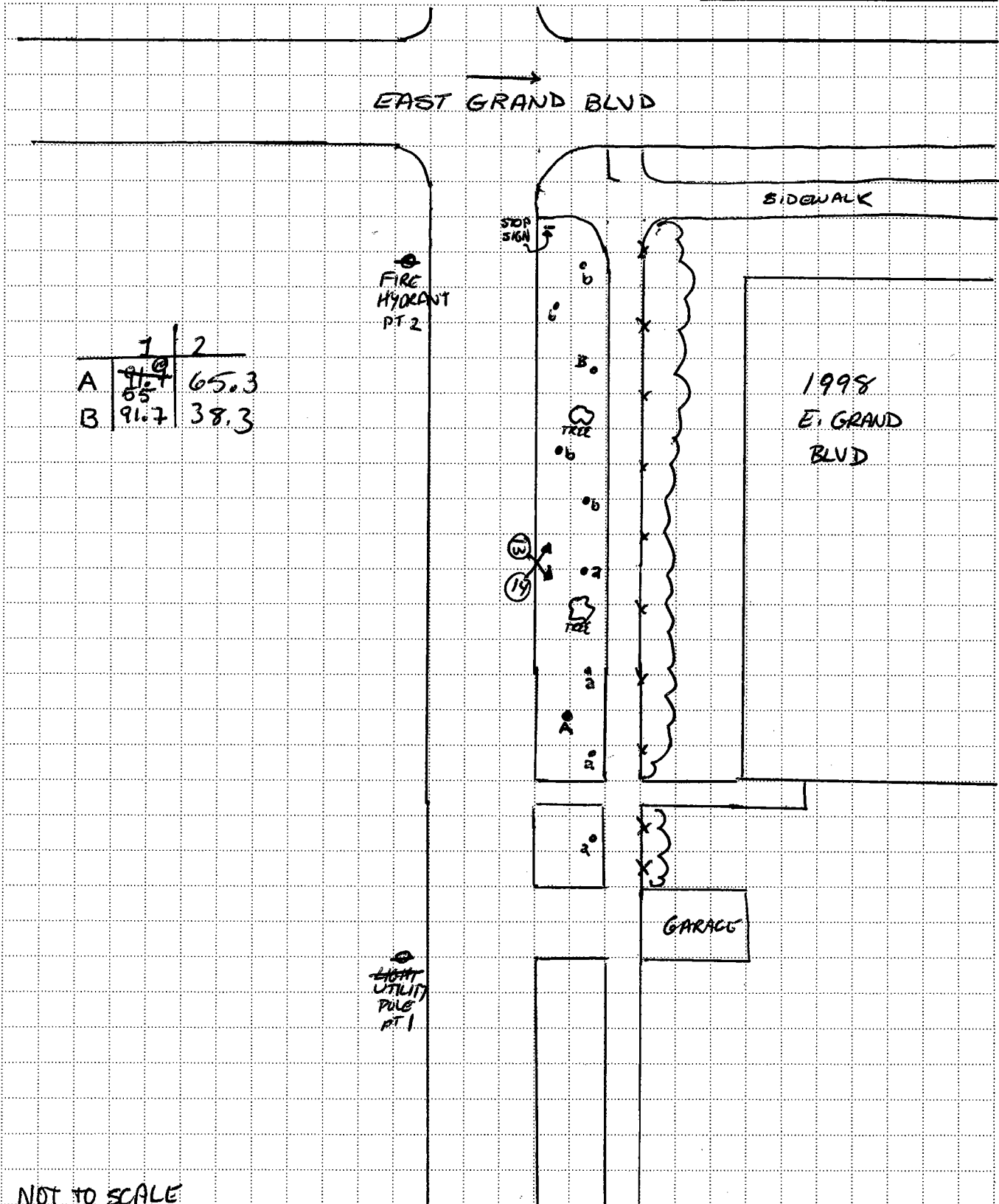
TASK DESCRIPTION MED-01998 - A+B TASK NO. _____

PREPARED BY R. Nemirovsky DEPT _____ DATE 11/05/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>	
DEPT _____	DATE _____



NOT TO SCALE

CLIENT/SUBJECT JOE CAMPAN SHEET of

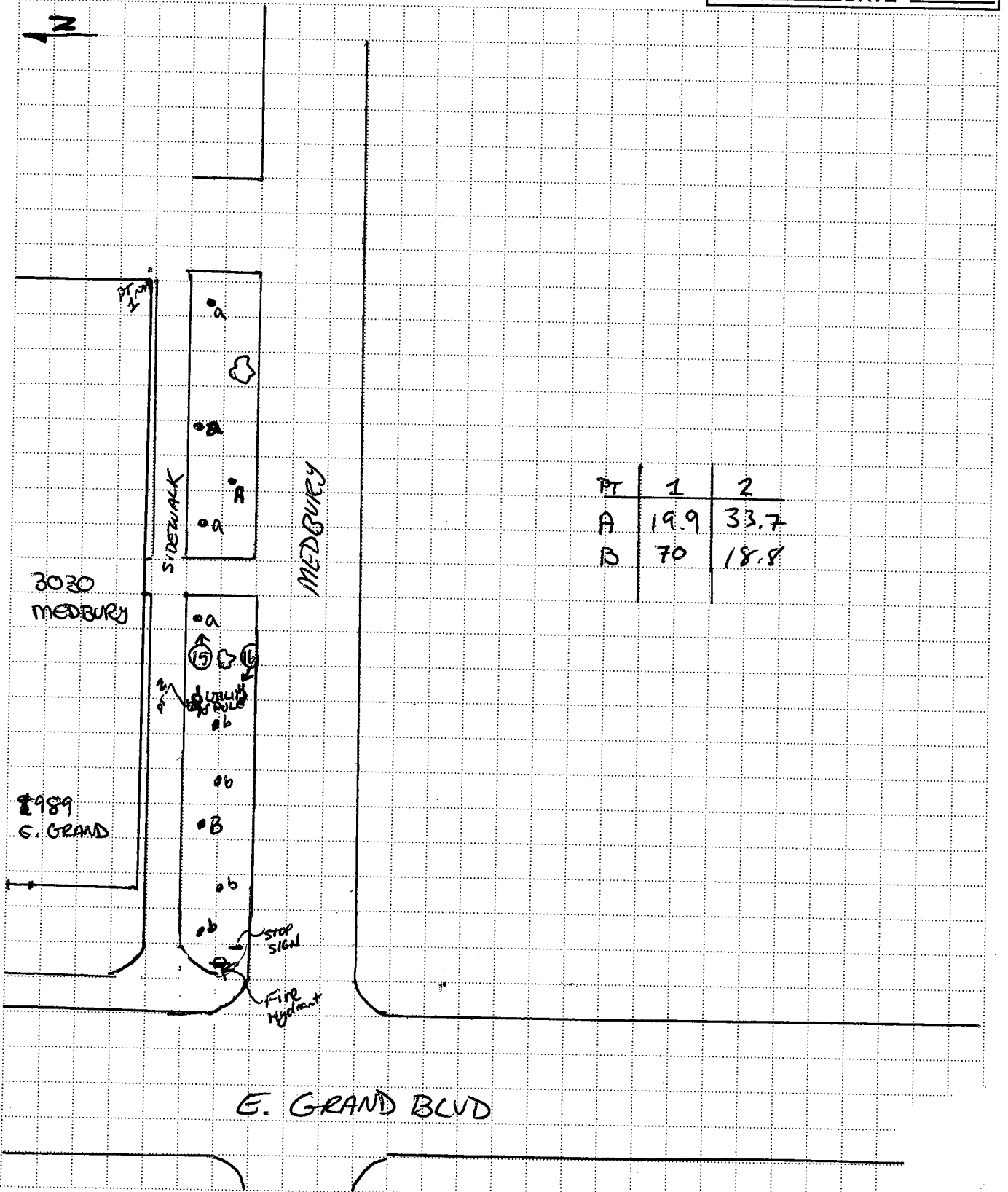
TASK DESCRIPTION MED-03030 - A + B W.O. NO.

PREPARED BY R. NEMIROVSKY DEPT DATE 11/03/03 TASK NO.

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY	
DEPT <u> </u>	DATE <u> </u>



CLIENT/SUBJECT Joe Campan W.O. NO. _____

TASK DESCRIPTION Med-5901-A-B TASK NO. _____

PREPARED BY R Nemirovsky DEPT _____ DATE 11/06/03

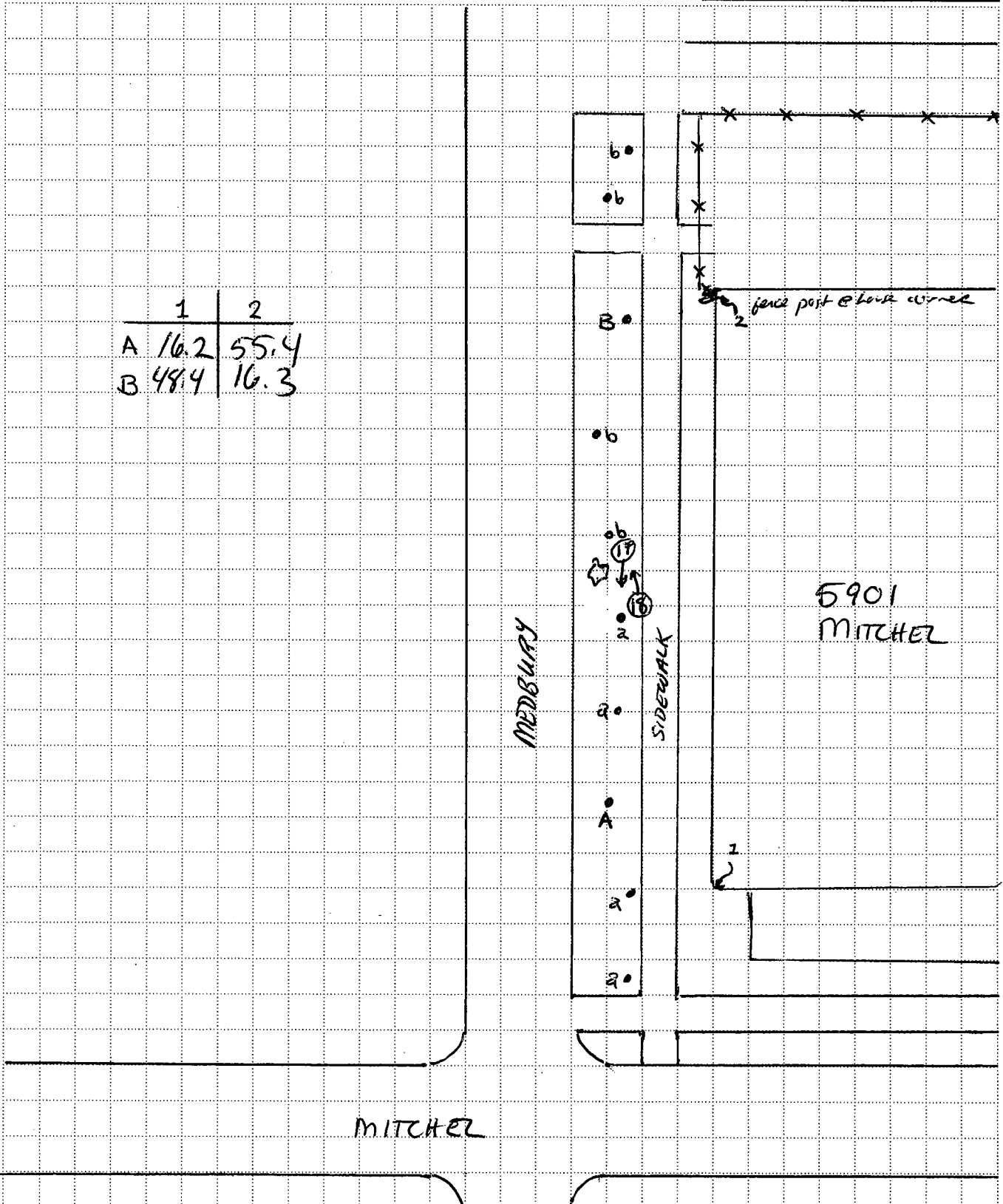
MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



	1	2
A	16.2	55.4
B	48.4	16.3



CLIENT/SUBJECT JOE CAMPAU

W.O. NO. _____

TASK DESCRIPTION HEN-02918-A-B

TASK NO. _____

PREPARED BY R. Nemirovsky

DEPT _____

DATE 11/06/03

MATH CHECK BY _____

DEPT _____

DATE _____

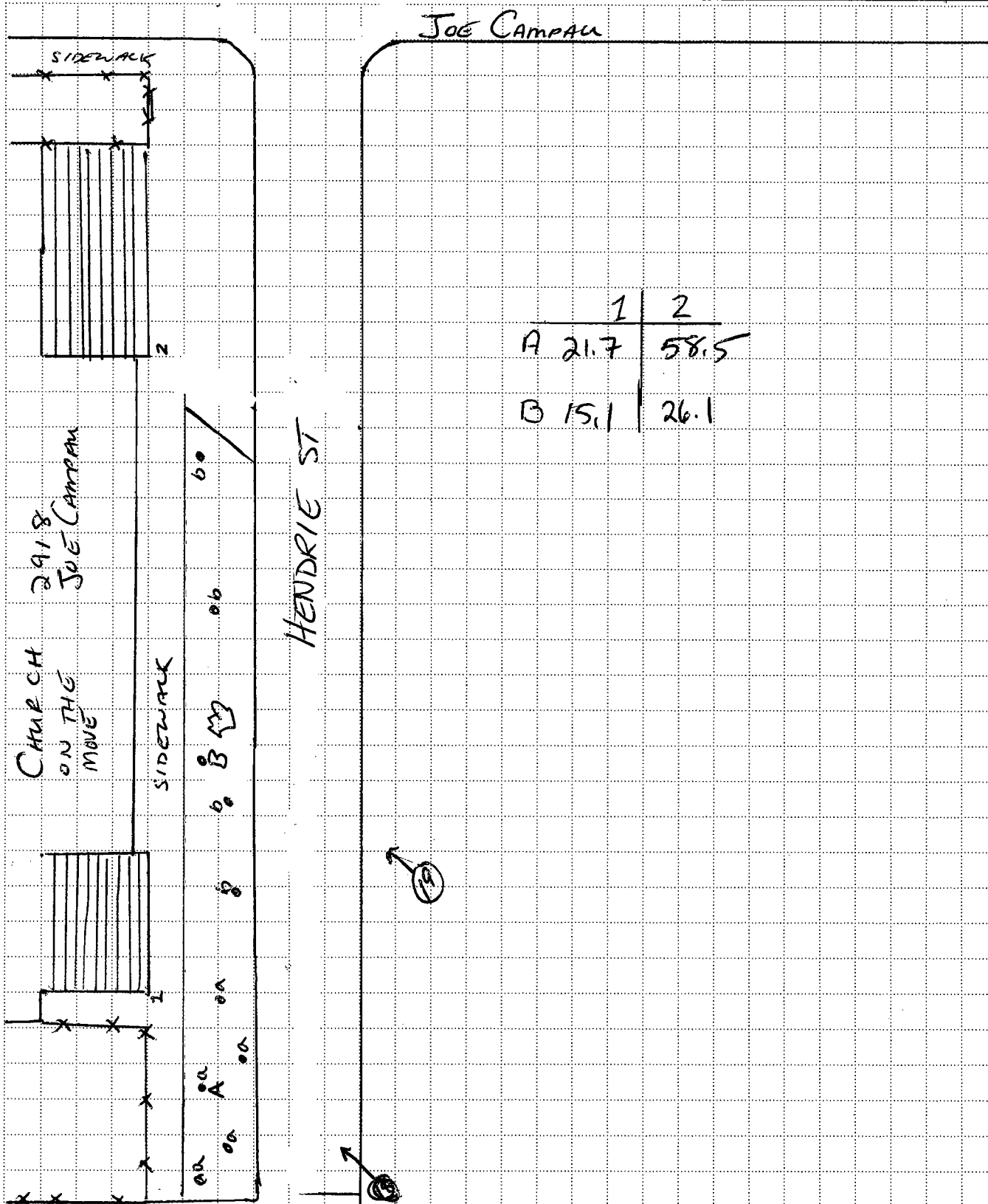
METHOD REV. BY _____

DEPT _____

DATE _____

APPROVED BY

DEPT _____ DATE _____



CLIENT/SUBJECT JOE CAMPAN W.O. NO. _____

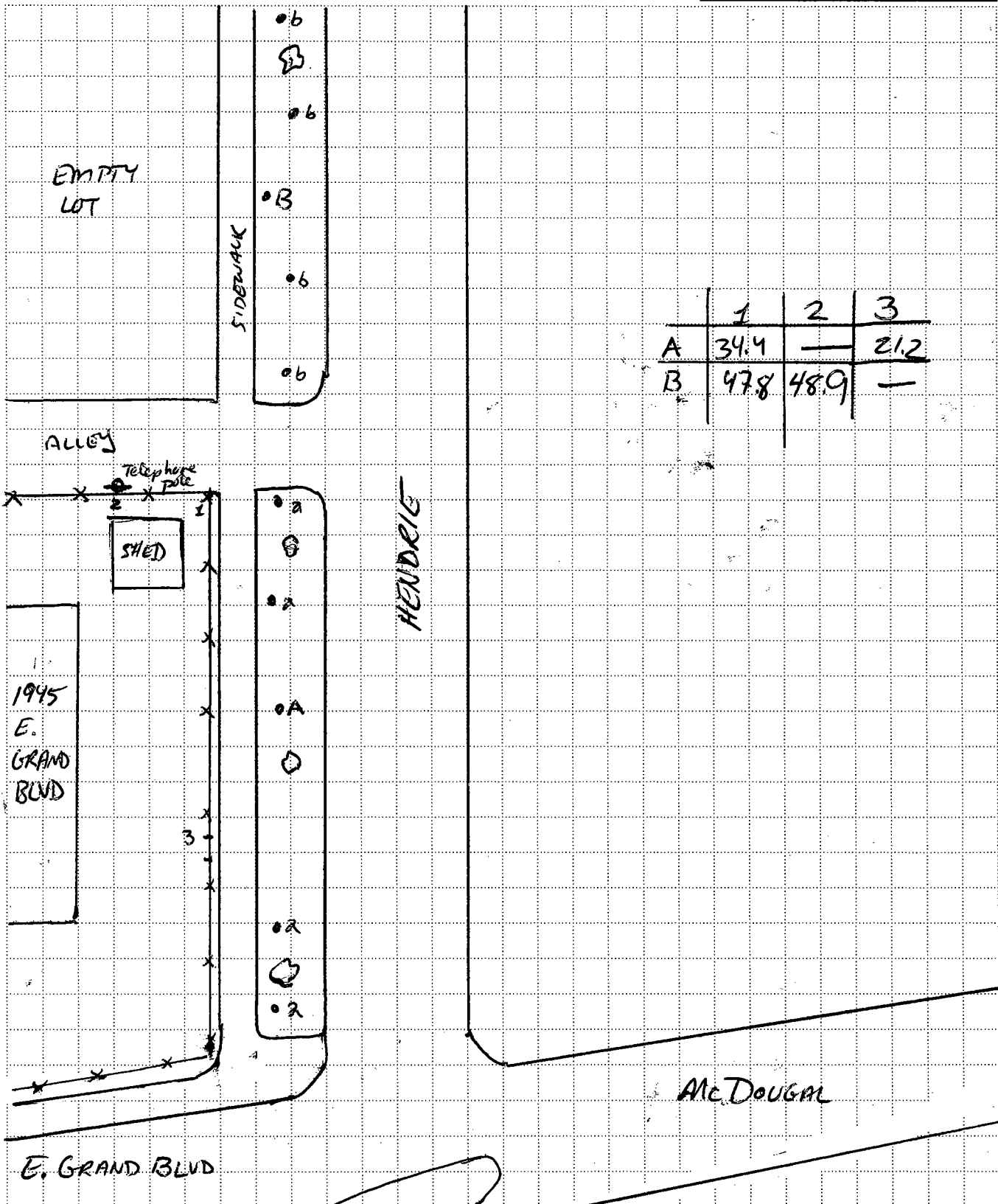
TASK DESCRIPTION HEN-1945 - A + B TASK NO. _____

PREPARED BY R. NEMICKOSKY DEPT _____ DATE 11/06/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



Former Michigan Smelting - 7885 Joseph Campau Street

2525 E Grand Blvd – Greenway at the corner of E Grand Blvd and Milwaukee St. It is located on the north side of Milwaukee St and to the south side of a fence surrounding the Midwest Steel building located at 2525 E Grand Blvd.

Looking east along greenway at 5 discrete sample A locations.



Looking west along greenway at 5 discrete sample B locations.



Joseph Campau (cont'd)

1530 Trombly – Greenway located on the south side of Trombly St and to the north of a fence surrounding the DTE Energy building located at 1530 Trombly.

Looking northeast along greenway at 5 discrete sample A locations.



Looking northeast along greenway at 5 discrete sample B locations.



Joseph Campau (cont'd)

2445 E Grand Blvd – Greenways located in front and to the east of a fence surrounding the Simon and Leeman Fruits & Vegetables Distributor building located at 2445 E Grand Blvd. Samples A and B were sampled on greenway on the west side of southbound E Grand Blvd and samples C, D, E, F, G, and H were samples on greenway between the north and south bound lanes of E Grand Blvd.

Looking north along greenway west of southbound E Grand Blvd at sample A and B locations, respectively.



Looking south between north and southbound E Grand Blvd at sample C locations.



Looking north between north and southbound E Grand Blvd at sample D locations.



Joseph Campau (cont'd)

2445 E Grand Blvd (cont'd)

Looking north between north and southbound E Grand Blvd at sample E and F locations, respectively.



Looking north between north and southbound E Grand Blvd at sample G and H locations, respectively.



Joseph Campau (cont'd)

1904 E Grand Blvd – Greenway located on the south side of E Grand Blvd in between an empty lot, a house at 1904 E Grand Blvd, and a parking lot on the corner of Elmwood and E Grand Blvd.

Looking northeast along greenway at 5 discrete sample A locations.



Looking southeast along greenway at 5 discrete sample B locations.



Joseph Campau (cont'd)

1998 E Grand Blvd – Greenway on the corner of Medbury St and E Grand Blvd. It is located on the north side of Medbury St and to the south side of the house at 1998 E Grand Blvd.

Looking northeast along greenway at 5 discrete sample A locations.



Looking northwest along greenway at 5 discrete sample B locations.



Joseph Campau (cont'd)

3030 Medbury – Greenway located on the south side of Medbury St and to the south side of the house at 3030 Medbury.

Looking west along greenway at 5 discrete sample A locations.



Looking east along greenway at 5 discrete sample B locations.



Joseph Campau (cont'd)

5901 Mitchell – Greenway on the corner of Mitchell St and Medbury St. It is located on the north side of Medbury St and to the south side of the house at 5901 Mitchell.

Looking east along greenway at 5 discrete sample A locations.



Looking west along greenway at 5 discrete sample B locations.



Joseph Campau (cont'd)

2918 Hendrie – Greenway on the corner of Hendrie St and Joseph Campau St. It is located on the south side of Hendrie St and to the north side of a church at 2918 Hendrie.

Looking southwest along greenway at 5 discrete sample A locations.



Looking southwest along greenway at 5 discrete sample B locations.



Joseph Campau (cont'd)

1945 E Grand Blvd – Greenway on the corner of Hendrie St and E Grand Blvd. It is located on the south side of Hendrie St and to the north side of a house at 1945 E Grand Blvd and an empty lot (lot directly west of house; house and lot are separated by an alley).

Looking west along greenway at 5 discrete sample A locations.

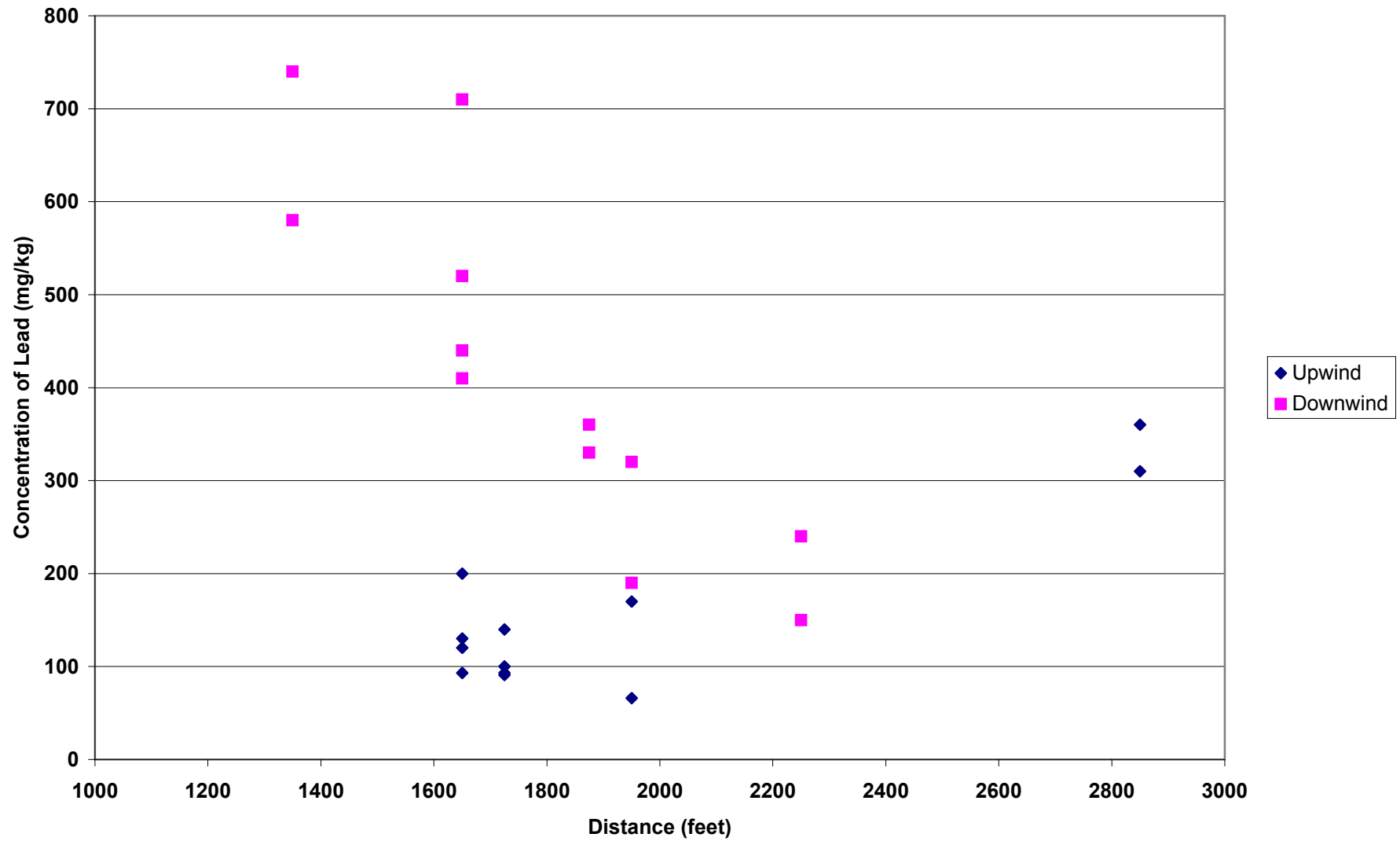


Looking east along greenway at 5 discrete sample B locations.



ATTACHMENT E
CONCENTRATION GRAPH

7885 Joseph Campau



Michigan Smelting

*** Linear Model ***

Call: lm(formula = Lead.ppm ~ Location + Distance.ft + Distance.ft:Location, data = Michigan, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-133.9	-30.89	-5.27	24.16	216.4

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	-190.4388	103.3352	-1.8429	0.0802
Location	1617.4329	176.5804	9.1598	0.0000
Distance.ft	0.1800	0.0524	3.4344	0.0026
Distance.ft:Location	-0.7457	0.0949	-7.8568	0.0000

Residual standard error: 77.3 on 20 degrees of freedom

Multiple R-Squared: 0.8672

F-statistic: 43.55 on 3 and 20 degrees of freedom, the p-value is 5.898e-009

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	404820.4	404820.4	67.74967	0.0000001
Distance.ft	1	7032.6	7032.6	1.17696	0.2908801
Distance.ft:Location	1	368845.2	368845.2	61.72896	0.0000002
Residuals	20	119504.7	5975.2		

*** Linear Model ***

Call: lm(formula = Log.Lead ~ Location + Distance.ft + Distance.ft:Location, data = Michigan, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-0.751	-0.1614	0.01587	0.1647	0.6208

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	3.2305	0.4033	8.0102	0.0000
Location	5.3833	0.6892	7.8114	0.0000
Distance.ft	0.0009	0.0002	4.2871	0.0004
Distance.ft:Location	-0.0024	0.0004	-6.4305	0.0000

Residual standard error: 0.3017 on 20 degrees of freedom

Multiple R-Squared: 0.8446

F-statistic: 36.23 on 3 and 20 degrees of freedom, the p-value is 2.815e-008

Analysis of Variance Table

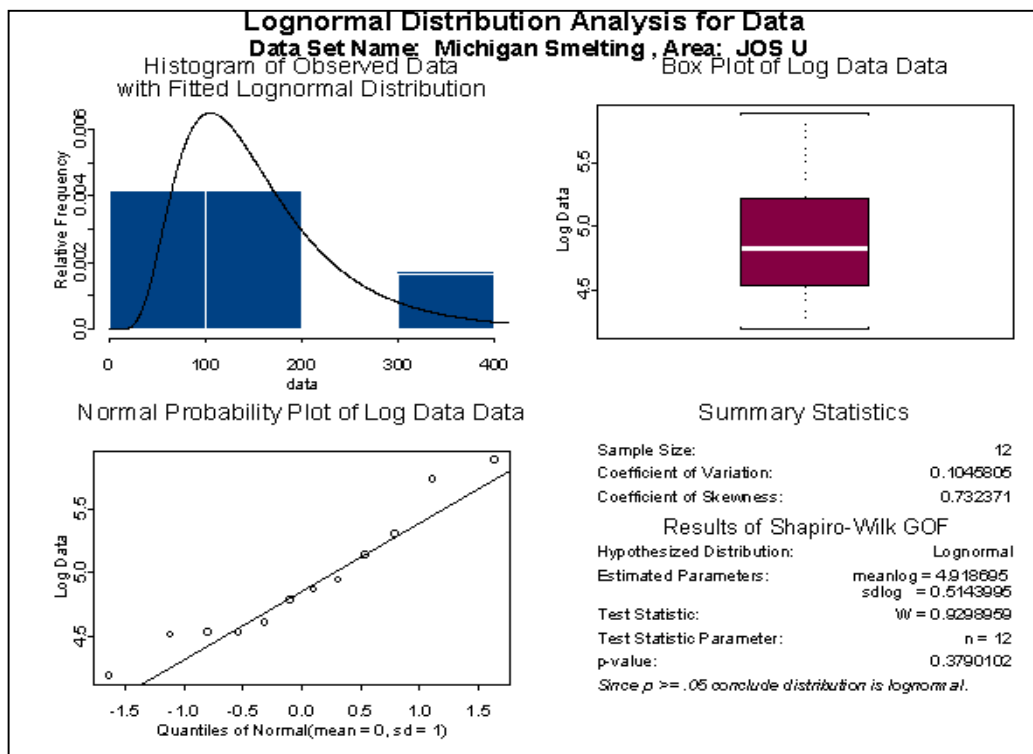
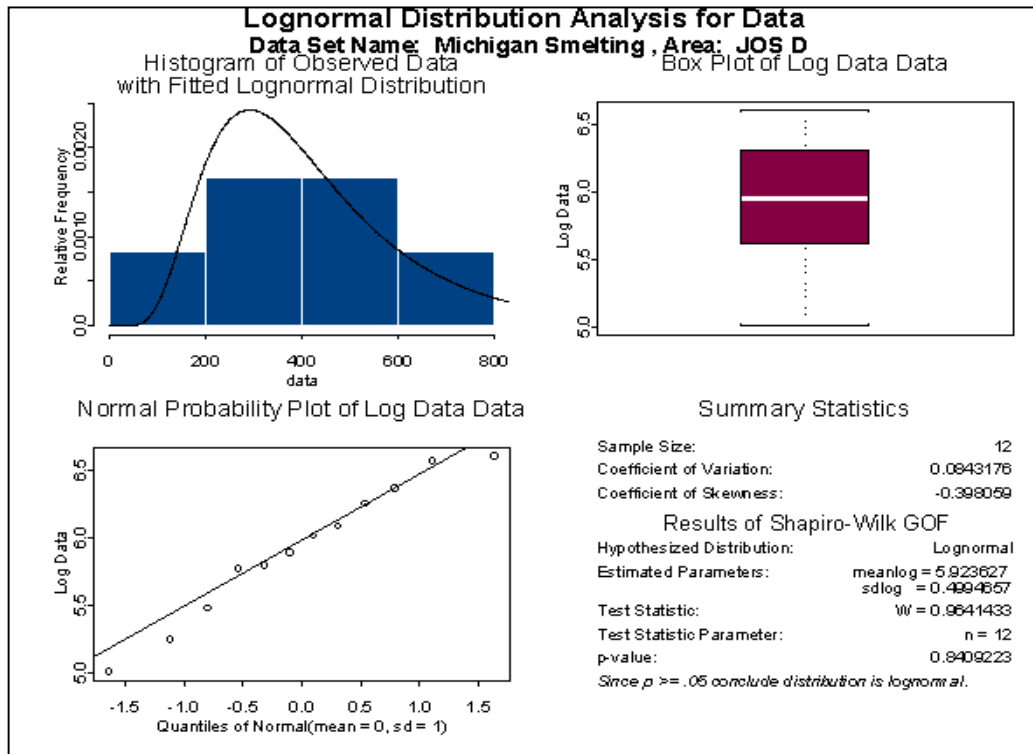
Response: Log.Lead

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	6.059322	6.059322	66.57476	0.0000001
Distance.ft	1	0.070912	0.070912	0.77912	0.3878968
Distance.ft:Location	1	3.763584	3.763584	41.35111	0.0000028
Residuals	20	1.820306	0.091015		

ATTACHMENT F
STATISTICAL DISTRIBUTION

MICHIGAN SMELTING STATISTICAL DISTRIBUTION



Appendix B

Great Lakes Smelting Phase I Summary Report

DRAFT

**PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
GREAT LAKES SMELTING – 1640 EAST EUCLID STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place

Suite 2-300

3058 West Grand Boulevard

Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.

2501 Jolly Road

Suite 100

Okemos, Michigan 48864

February 2004

W.O. No.: 20083.028.001

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Great Lakes Smelting Company (the Facility), 1640 East Euclid Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at the adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 6, 7 and 10 November 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from Facility during historic smelting operations. However lead concentrations exceeding the screening level were found downwind. Therefore, it is recommended that additional soil samples be collected from additional properties located within 1500 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would include:

- Obtain access to the current property for review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical Facility operations;
- Perform a Facility walk to determine existing conditions;
- Collect onsite soil samples to determine the presence, concentration, and extent of lead on the site (related to the location of former structures, if possible); and

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Title

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Attachment B	Tables
Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Great Lakes Smelting (the Facility) – 1640 East Euclid Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Summary Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E** – Concentration Graph, and
- **Attachment F** – Statistical Distribution.

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 1640 East Euclid Street in Hamtramck, Wayne County, Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the Facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility appears to be located north of some warehouses and south of the American Axle plant surrounding the Holbrook site. The parking lot is fenced in with a Stress Con Industries Inc. Plant 6 sign posted. The area five blocks to the north of the Site is industrial, mainly consisting of the American Axle parking lot. The area five blocks to the south of the Facility is industrial, mainly warehouses. The area five blocks east of the Facility is industrial, mainly the American Axle Plant. The area five blocks west of the Facility is industrial, mainly freeway with residences west of the freeway.

2.1.2 Site History

A review of the Bresser's city directory review indicated that East Side Metal Company and Schuster Max D atty owned the property in 1946; Great Lakes Smelting and Schuster Max D atty in 1951; and Jeffrey P Berger, Max D Schuster, and GR Lakes Smelting Company in 1961. There are no listings for the address from 1971 to the present.

Review of the Sanborn maps for this address show the following chronology: 1951 Scrap Metal Stage present with Steel Truss & Joists; 1968 Scrap Metal Stage present; 1970 to 2002 vacant lot and/or building present.

The aerial photograph review indicated that this area has been industrial from 1957 to the present with the nearest residential area located approximately 900 feet (ft.) west of the address. Structures identified from the most recent aerial photograph (2003 GlobeXplorer™) include a large building which occupies almost the entire property. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the fire records, no records were found.

Review of the BEA for nearby “1614 and 1660 Clay Avenue”, dated September 1998, prepared by Vision Environmental Inc. for Wintor-Swan Associates L.L.C., indicates that lead was detected on the Sites at levels up to 28,000 mg/kg and exceeded the MDEQ Part 201 RDCC.

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter-related releases are present off-site and could be attributed to the former Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000-foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for the Facility.

Prior to sample collection, upwind and downwind sampling areas were established, 1,900 and 1,800 ft. from the Site, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or state owned properties located within these established areas.

The City and/or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual City or State owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, and photo documentation) were conducted as described in the Comprehensive Summary. Because 12 City and/or State owned parcels were not available in the sample radius for the Facility, WESTON collected samples from six City and/or State owned parcels in the upwind direction and four greenways in the downwind direction in the vicinity of the Facility. Two composite samples were collected from each of the six upwind parcels. Eight composite samples were collected from two larger

downwind greenways because they encompassed approximately four average sized parcels, and four composite samples were collected from two average sized greenways. A total of 24 composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky, Ms. Amanda Freeman, and Mr. Erik Martinson conducted field sampling on 6 and 7 November 2003. WESTON personnel, Ms. Lewis and Mr. Martinson, along with Ms. Nemirovsky and Ms. Freeman, conducted field sampling on 10 November 2003. Since City and/or State owned parcels were not available in the downwind direction, WESTON selected greenways, prior to the sampling event, and submitted them to the City of Hamtramck to obtain their approval and access. When greenways were not located on the same street as the mailing address of the nearest building, the number of the building was used in conjunction with the street of the greenway. For example, a building located on 8435 Aubin Street with a greenway located across the street off of Denton Street, would be identified as DEN – 08435. These changes were noted in the logbook and can be viewed on the “Summary Table For Sample Properties” (located in **Attachment B**) and the sample sketches (located in **Attachment A**). WESTON collected samples from four downwind greenways: Two composite samples were collected from two of the downwind greenways and eight composite samples were collected from two larger upwind greenways for a total of 12 upwind samples. Also, two composite samples were taken from each of the six upwind city and/or state owned parcels for a total of 12 upwind samples. Twenty-four soil samples were submitted for analysis. Five samples were designated as matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- 12 composite soil samples in the downwind direction.

Sample locations from both the upwind and downwind areas are listed in **Table 1** included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. One sample collected from properties upwind of the former Facility contained concentrations of lead above the project screening level (400 milligram per kilogram [mg/kg]) established in the Phase I QASP. Four samples collected from properties downwind of the former Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	1	92-440
Downwind	12	4	37-790
Total	24	5	37-790

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were chosen based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind

direction in the City of Detroit Metropolitan area. If smelting operations occurred, lead in soils resulting from aerial deposition would be found downwind in the northeast direction from the Facility. Parcels ranging from 1,600 ft. to 1,900 ft. were chosen southwest in the upwind direction of the Facility. Parcels ranging from 1,000 ft. to 1,750 ft. were chosen northeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. Lead concentrations were found in the upwind and downwind direction of the Facility. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus, the Phase I investigation was designed to determine if an off-site airborne release has occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **(Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind and upwind envelopes.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the Facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated similar concentrations of lead in the upwind and downwind direction. Elevated levels of lead are found in the both directions but do not show any clear indication downwind of a decreasing concentration, a condition that would be expected if an aerial release of lead had occurred due to smelting operations. These conclusions were confirmed by a linear regression of the concentration versus distance data (**Attachment E**).

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind log mean is 5.1 mg/kg and the upwind mean is 5.0 mg/kg indicating the downwind and upwind concentrations are similar. Comparison of the relative frequency histogram (**Attachment F**) for the downwind and upwind data indicates, for both data sets, a higher frequency of occurrence between 0 and 200 mg/kg and a greatly decreasing frequency above 300 mg/kg also indicating the data are similar data sets. Comparison of the upwind and downwind data sets indicates the lead concentrations are similar to each other both in mean concentration and distribution to conclude that the data represent the same conditions.

4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility does not suggest that lead contamination detected in downwind locations is attributable to historic releases from historic smelting operations at the Facility. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U.S. EPA Act 1994, as amended.

Samples collected from upwind and downwind of the Facility contained concentrations of lead above the screening level. Additionally, the downwind samples show a no clear trend of decreasing concentration with increasing distance with levels of lead starting under 50 mg/kg and rising to 790 mg/kg approximately 1,700 ft. from the Facility. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from the Facility during historic smelting operations. However, the presence of lead at concentrations above the screening level downwind of the Facility does not allow a definitive conclusion of this finding.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

The results of this investigation do not indicate that downwind soils at properties have been impacted by releases of lead from the Facility as a result of aerial deposition related to historic smelting operations. However, due to the presence of lead at concentrations above the screening level downwind of the Facility, it is recommended that additional soil samples be collected from the additional properties located within 1500 feet downwind of the Facility.

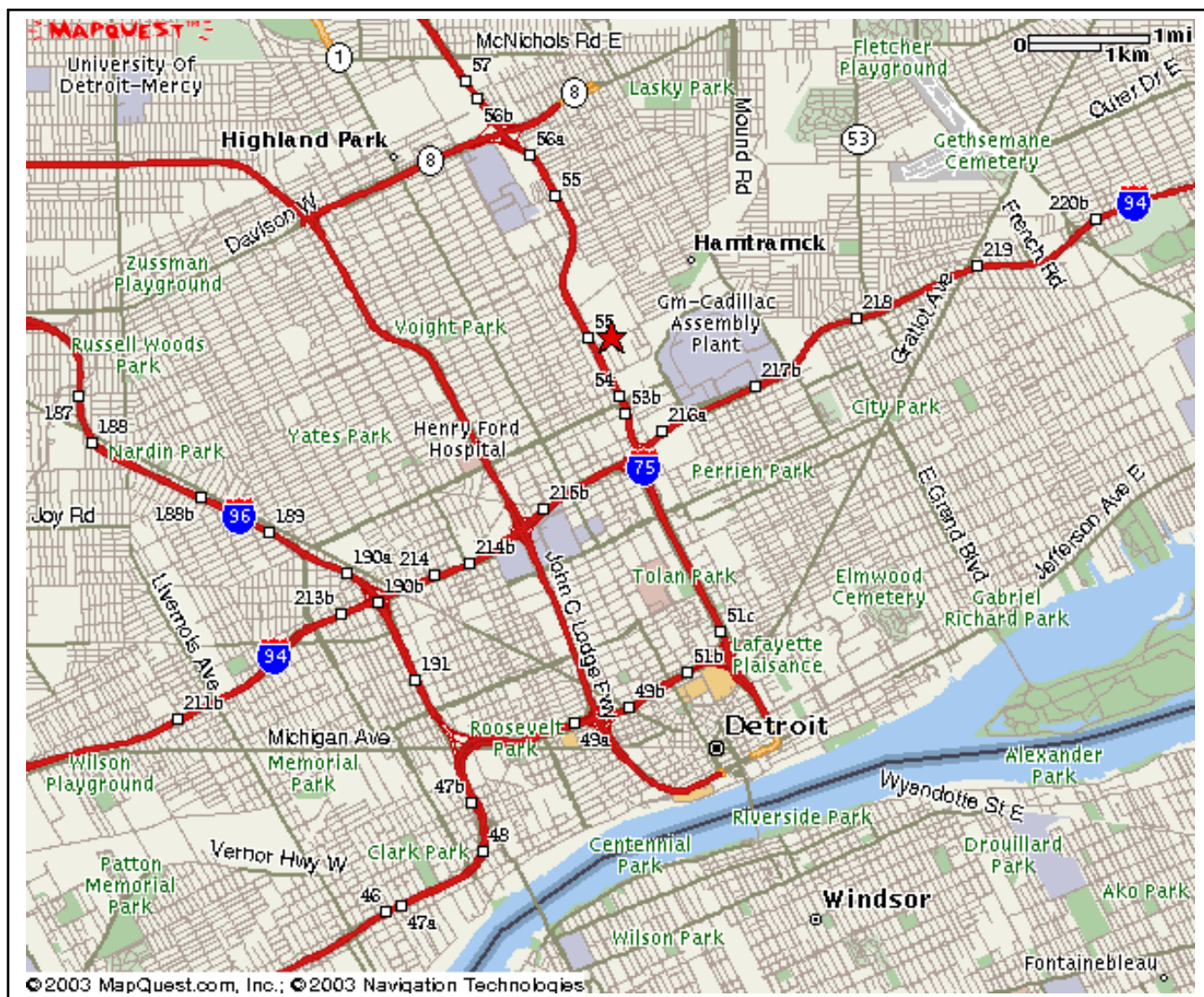
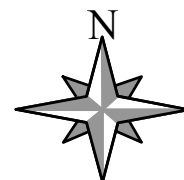
If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would include:

- Obtain access to the current property for review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical site operations;
- Perform a site walk to determine existing conditions; and
- Collect onsite soil samples to determine the presence, concentration, and extent of lead on the site (related to the location of former structures, if possible).

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
1640 East Euclid Street

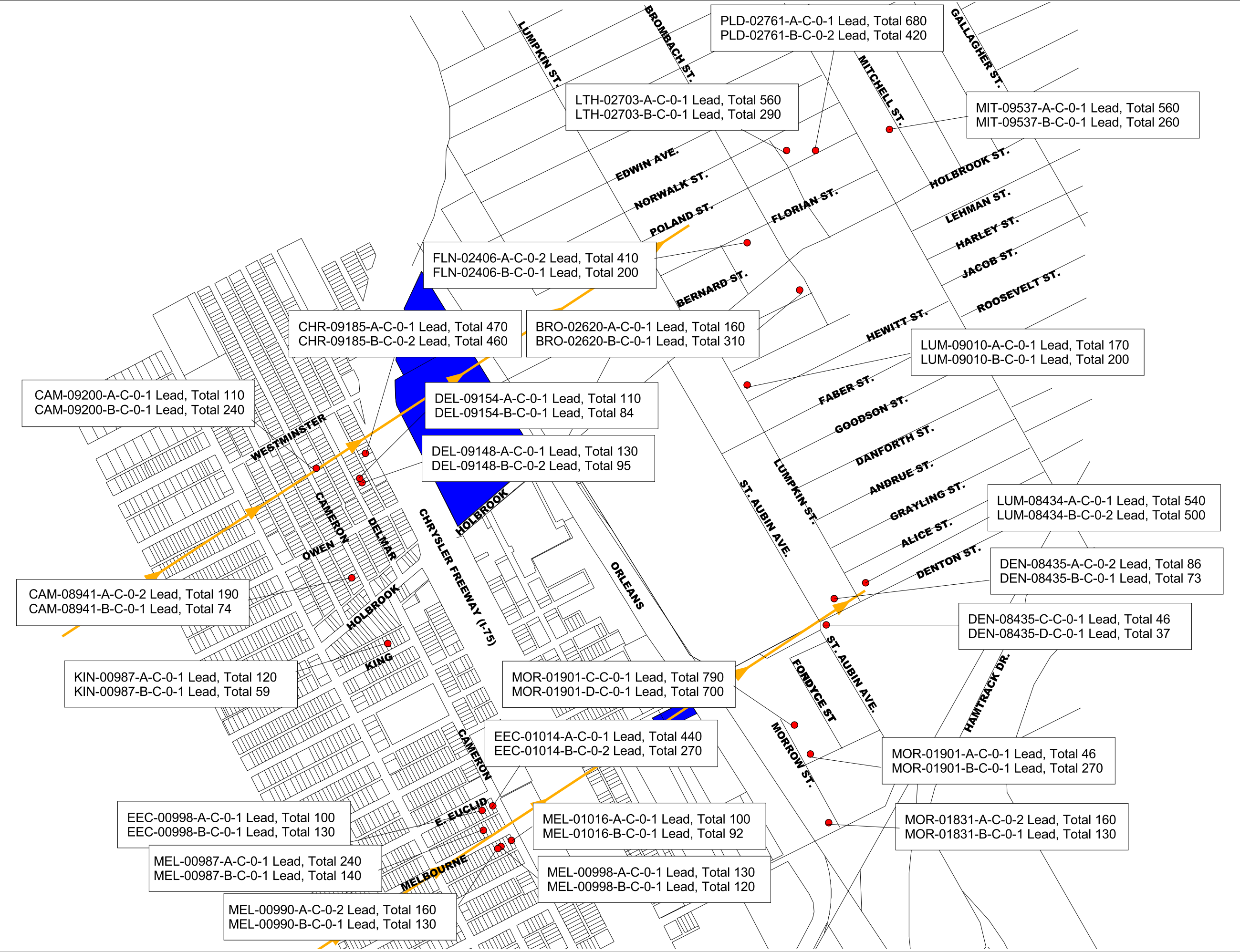


WESTON SOLUTIONS, INC. OF MICHIGAN



**300 River Place, Suite 2800
 Detroit, Michigan 48207**

**Detroit Lead Assessment Project
 Detroit, Wayne County, Michigan
 W.O. No. 20083.028.001**



LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

Sampling Locations

Wind Direction

Parcel Boundaries and Roads (Approximate)

Facility of Concern

Note: All Lead, Total analytical results are shown in mg/kg.

N

0 700 Feet

WESTON SOLUTIONS SM

PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Analytical Results Map

Acme Metal Co
1436 Holbrook Street
Great Lakes Smetling
1640 E. Euclid Street

WORK ORDER No.: 20083.028.001	PROJECT MANAGER:	
DRAWN BY: JLT	CHECKED BY:	
DRAWING NAME:	DIRECTORY/ FOLDER: JTID\DLAP\apr09_09_03_apr	
CONTRACT No.:	DELIVERY ORDER No.:	
SCALE:	REPORT DATE:	
DATE: January 2004	REVISION No.:	FIGURE No.: 2

ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
998 East Euclid	Vacant property located on the south side of East Euclid St.	EEC-00998-A-C-0-1
		EEC-00998-B-C-0-1
1014 East Euclid	Vacant property located on the south side of East Euclid St and at the corner of East Euclid and Cameron St.	EEC-01014-A-C-0-1
		EEC-01014-B-C-0-2
1016 Melbourne	Vacant property located on the south side of Melbourne St and at the corner of Melbourne and Cameron St.	MEL-01016-A-C-0-1
		MEL-01016-B-C-0-1
998 Melbourne	Vacant property located on the south side of Melbourne St and in between two other vacant lots.	MEL-00998-A-C-0-1
		MEL-00998-B-C-0-1
990 Melbourne	Vacant property located on the south side of Melbourne St and to the west of property at 998 Melbourne.	MEL-00990-A-C-0-2
		MEL-00990-B-C-0-1
987 Melbourne	Vacant property located on the north side of Melbourne St and to the west of another vacant property.	MEL-00987-A-C-0-1
		MEL-00987-B-C-0-1
Downwind Properties		
Address	Description	Sample Identification
8435 St Aubin	Greenway of vacant lot located across the street and to the east of 8435 St Aubin and to the north of Denton St.	DEN-08435-A-C-0-2
		DEN-08435-B-C-0-1
	Greenway located across the street and to the east of 8435 St Aubin and to the south of Denton St.	DEN-08435-C-C-0-1
		DEN-08435-D-C-0-1
8434 Lumpkin	Greenway located to the east of Lumpkin St in front of a fenced in lot and to the south of the property at 8434 Lumpkin.	LUM-08434-A-C-0-1
		LUM-08434-B-C-0-2
1901 Marston	Greenway located on the east side of Morrow St and on the corner of Morrow and Marston St. On the west side of the greenway is Wessel Co, an abandoned Factory.	MOR-01901-A-C-0-1
		MOR-01901-B-C-0-1
	Greenway located on the east side of Morrow St and across the street from an American Axle Plant gated driveway.	MOR-01901-C-C-0-1
		MOR-01901-D-C-0-1
1831 Clay	Greenway located to the west of Morrow St and to the east of an enclosed property located on the corner of Clay and Morrow St.	MOR-01831-A-C-0-2
		MOR-01831-B-C-0-1

*Notes:

Greenway identifiers were taken from the street the greenway was parallel to and not the actual street to which the property belonged.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
998 East Euclid	EEC-00998-A-C-0-1	100
998 East Euclid	EEC-00998-B-C-0-1	130
1014 East Euclid	EEC-01014-A-C-0-1	440
1014 East Euclid	EEC-01014-B-C-0-2	270
1016 Melbourne	MEL-01016-A-C-0-1	100
1016 Melbourne	MEL-01016-B-C-0-1	92
998 Melbourne	MEL-00998-A-C-0-1	130
998 Melbourne	MEL-00998-B-C-0-1	120
990 Melbourne	MEL-00990-A-C-0-2	160
990 Melbourne	MEL-00990-B-C-0-1	130
987 Melbourne	MEL-00987-A-C-0-1	240
987 Melbourne	MEL-00987-B-C-0-1	140
Downwind		
8435 St Aubin	DEN-08435-A-C-0-2	86
8435 St Aubin	DEN-08435-B-C-0-1	73
8435 St Aubin	DEN-08435-C-C-0-1	46
8435 St Aubin	DEN-08435-D-C-0-1	37
8434 Lumpkin	LUM-08434-A-C-0-1	540
8434 Lumpkin	LUM-08434-B-C-0-2	500
1901 Marston	MOR-01901-A-C-0-1	46
1901 Marston	MOR-01901-B-C-0-1	270
1901 Marston	MOR-01901-C-C-0-1	790
1901 Marston	MOR-01901-D-C-0-1	700
1831 Clay	MOR-01831-A-C-0-2	160
1831 Clay	MOR-01831-B-C-0-1	130

*Notes

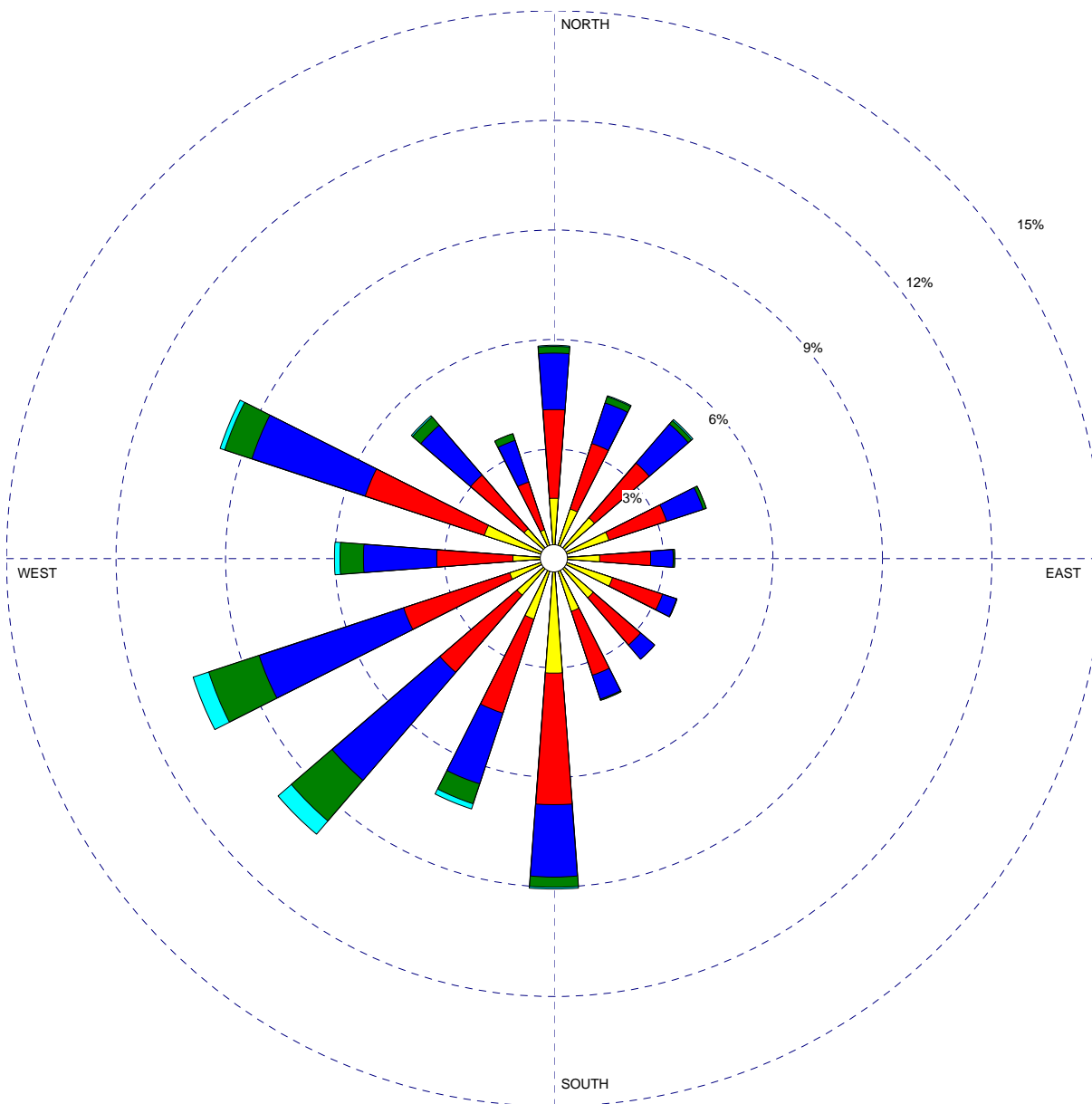
1) Bold indicates results equal or greater than to 400 mg/Kg

ATTACHMENT C

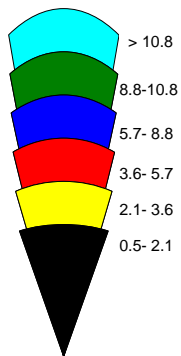
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

CLIENT/SUBJECT Euclid W.O. NO. _____

TASK DESCRIPTION EEC-00998 A+B, EEC-1014 Euclid TASK NO. _____

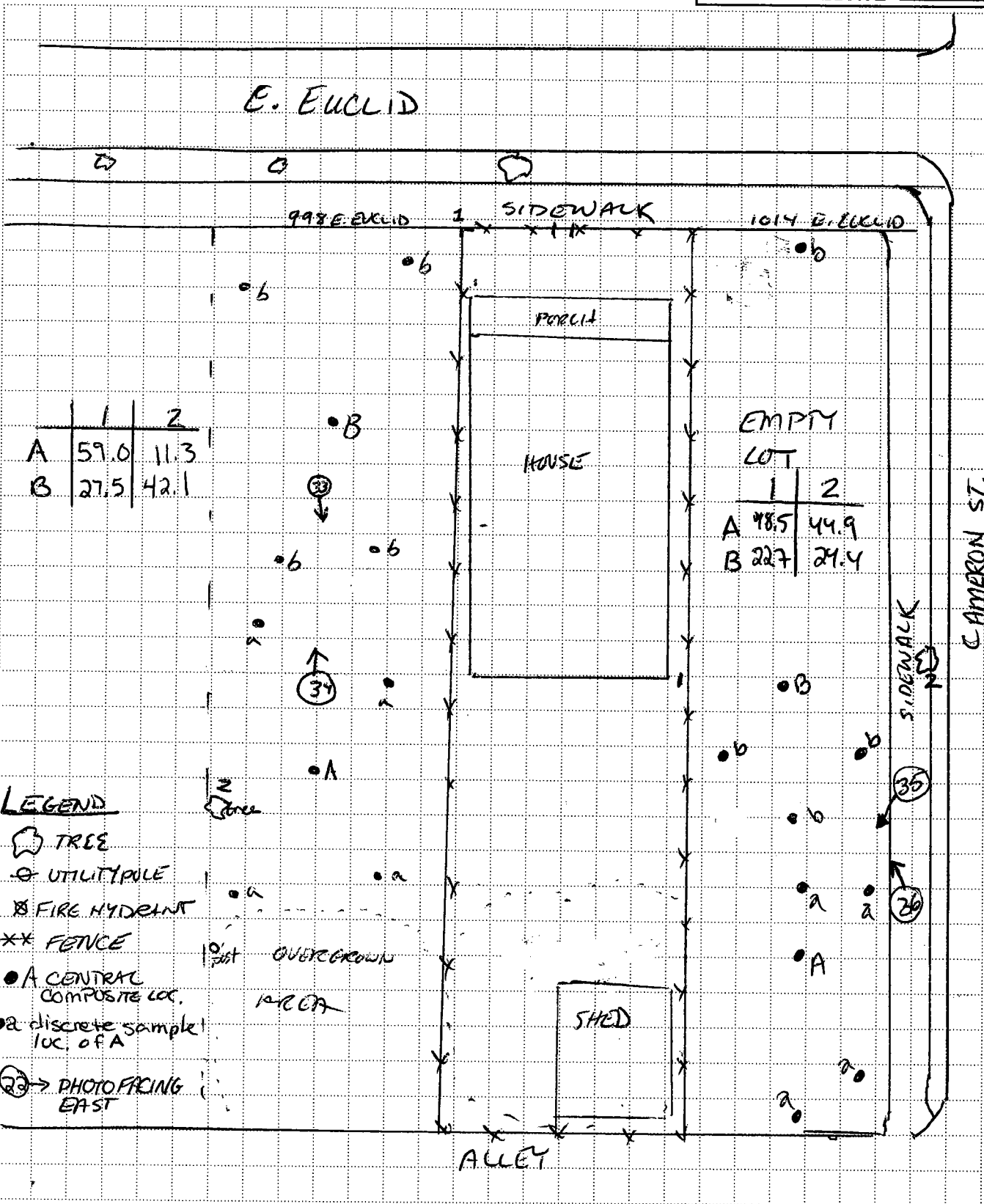
PREPARED BY R. Nemirsky DEPT _____ DATE 11/07/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____

4N



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TASK DESCRIPTION MEL-01016 A+B TASK NO. _____

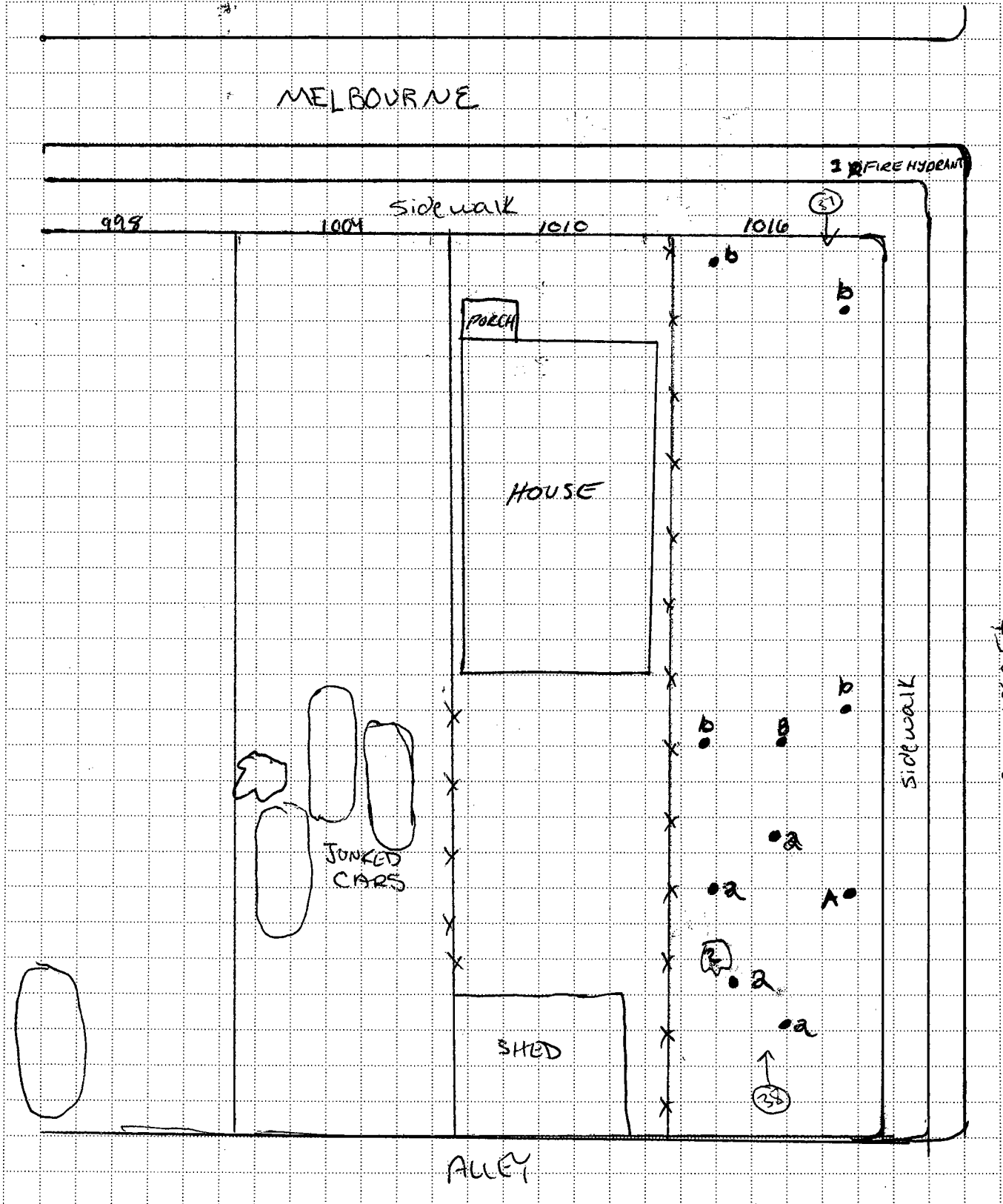
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MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
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DEPT _____	DATE _____

1N



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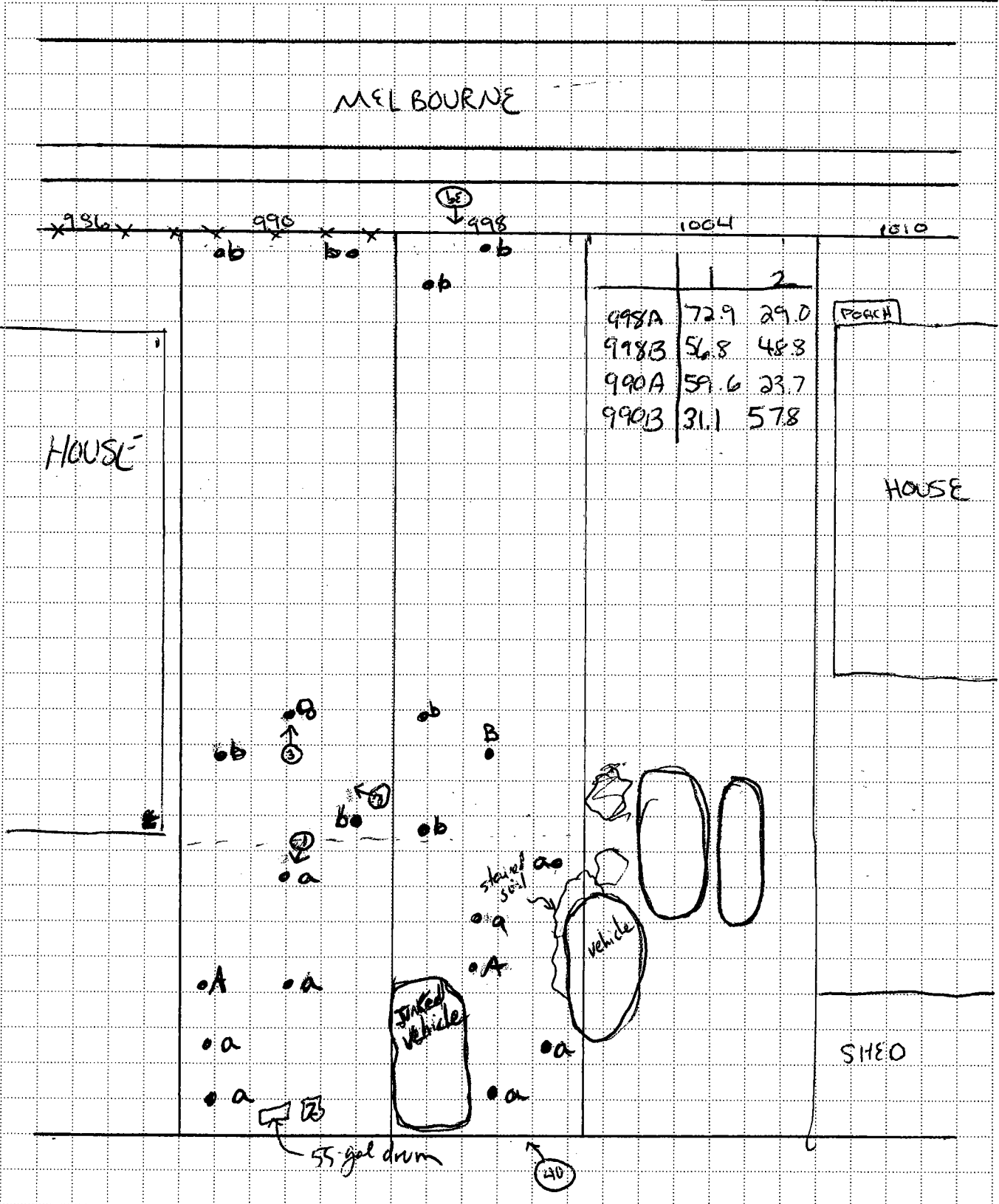
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PREPARED BY A. Freeman DEPT _____ DATE 11-7-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT Euclid W.O. NO. _____

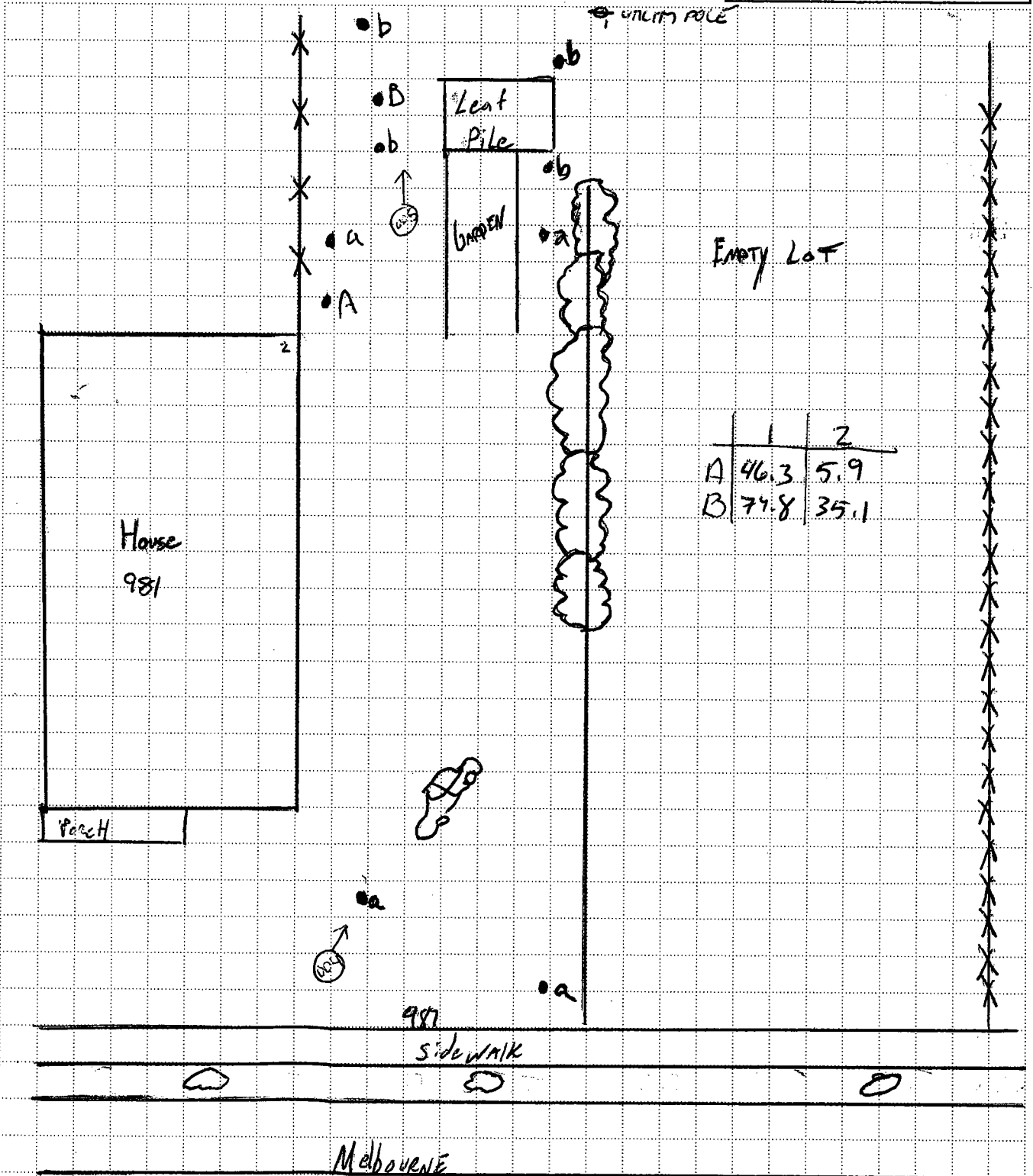
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PREPARED BY E. MARTINSON DEPT _____ DATE 11/10/03 APPROVED BY _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

DEPT _____ DATE _____



CLIENT/SUBJECT EUCLID W.O. NO. _____

TASK DESCRIPTION DED-08435 A.B.C.D + LUM - 08434 A+B TASK NO. _____

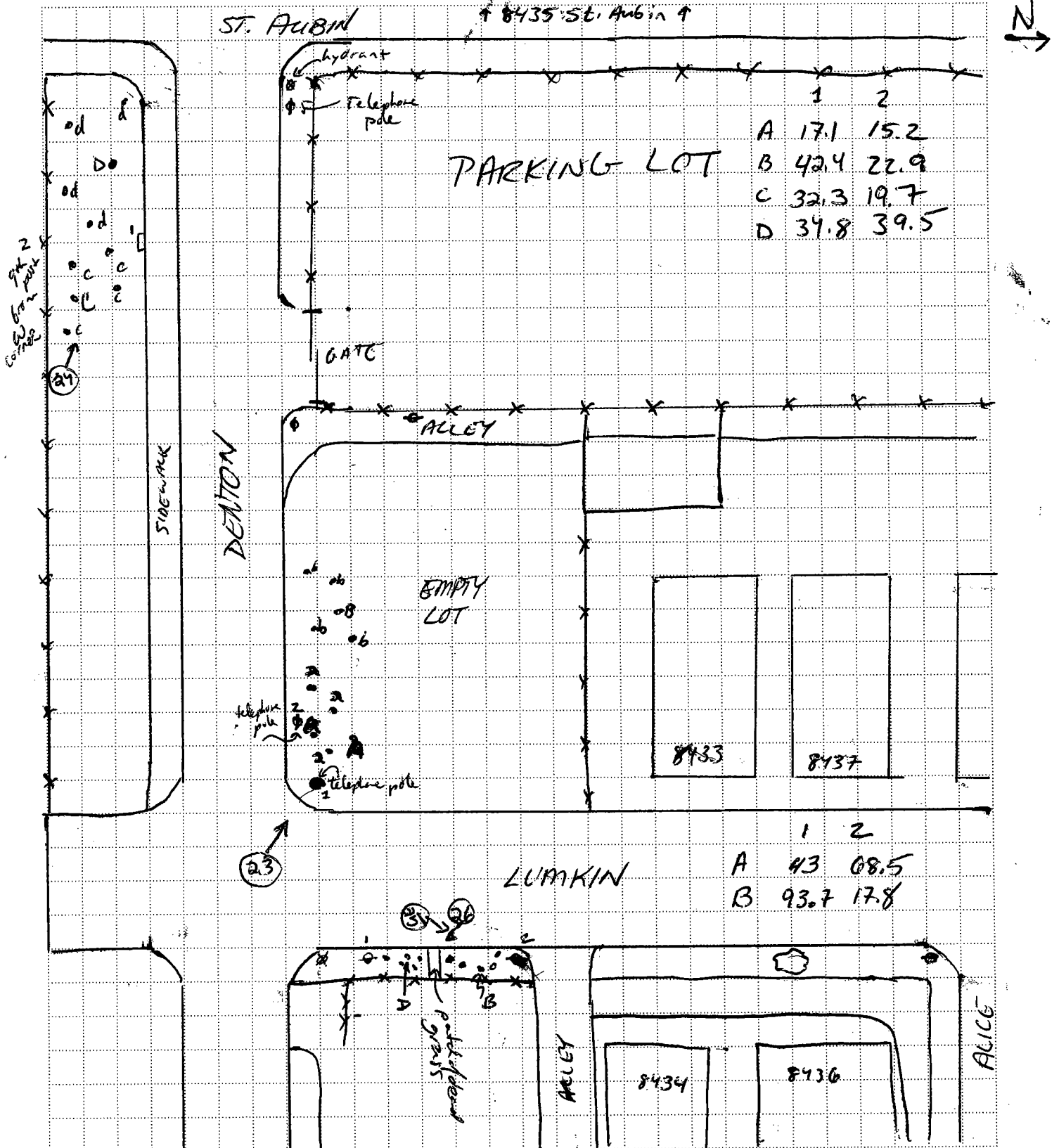
PREPARED BY R. NEMIRNSKI DEPT _____ DATE 11/06/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____

DEPT _____ DATE _____



CLIENT/SUBJECT Euclid W.O. NO. _____

TASK DESCRIPTION MOR-01901 A THROUGH D TASK NO. _____

PREPARED BY R Nemiravsky DEPT _____ DATE 11/07/03

MATH CHECK BY _____ DEPT _____ DATE _____

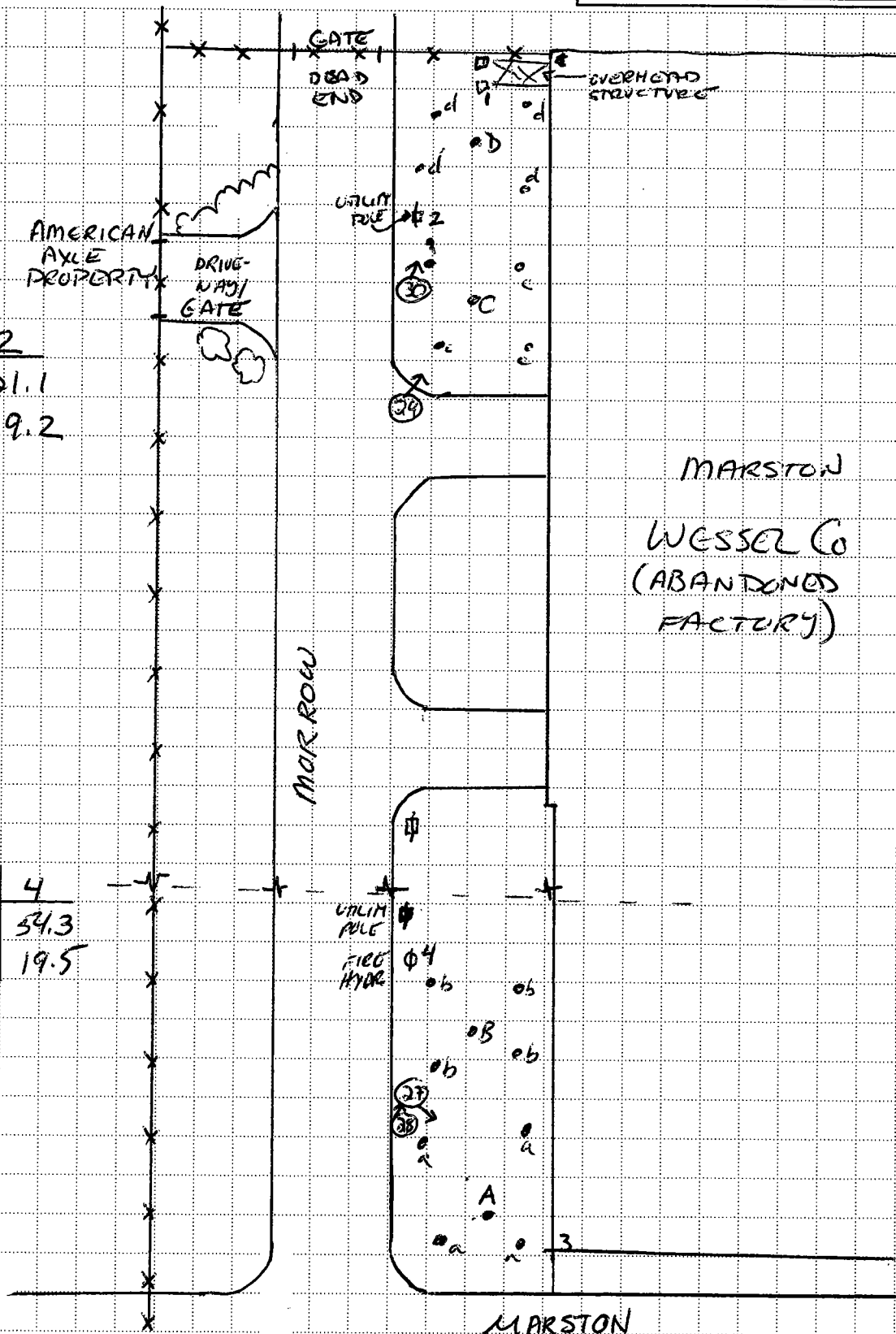
METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

	1	2
C	63.4	21.1
D	30.2	19.2

	3	4
A	20.9	54.3
B	53.2	19.5



CLIENT/SUBJECT EUCLID W.O. NO. _____

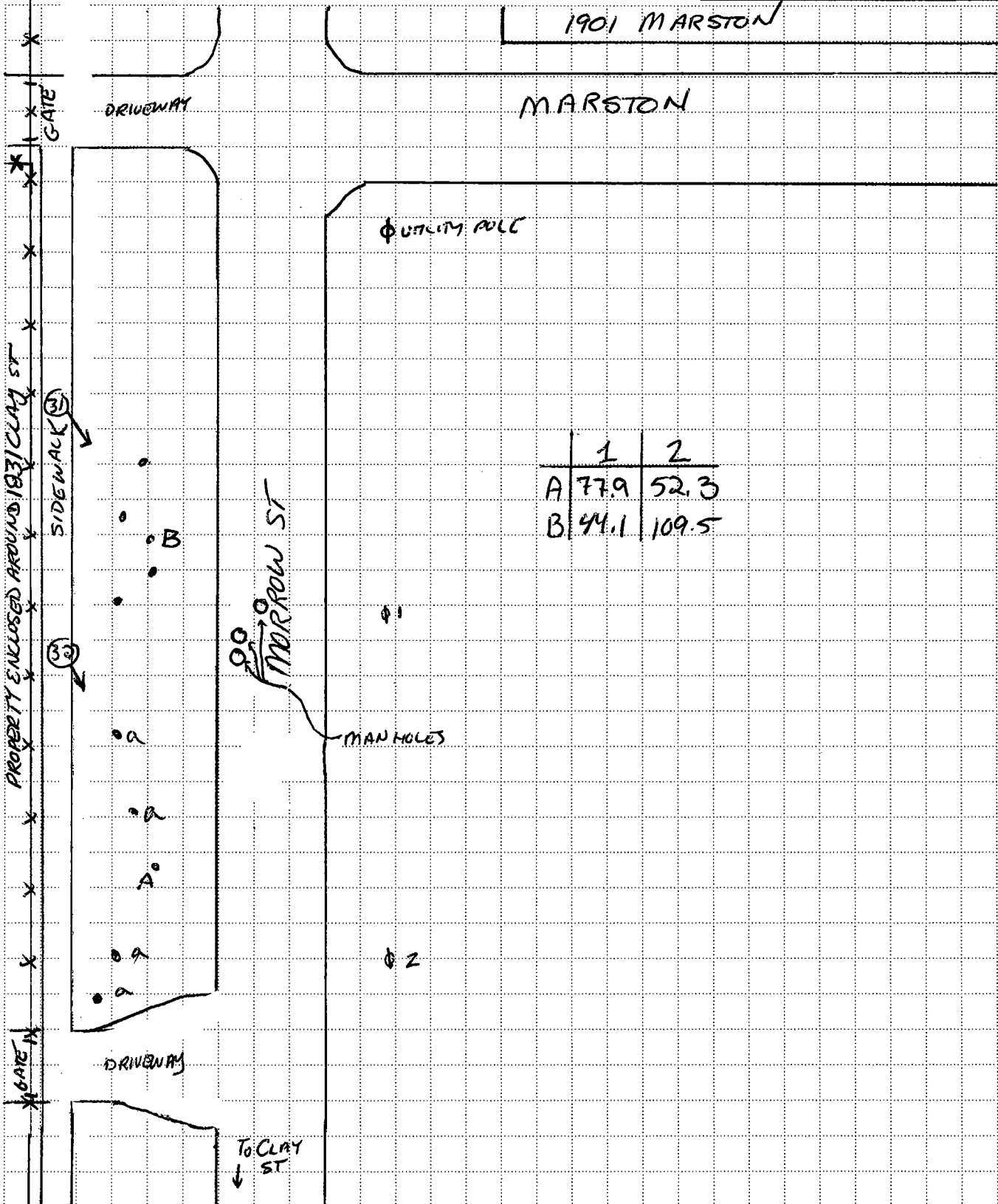
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PREPARED BY R. NEMIROVSKY DEPT _____ DATE 11/07/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



Former Great Lakes Smelting – 1640 East Euclid

998 East Euclid – Vacant property located on the south side of East Euclid St.

Looking south along the vacant property at 5 discrete sample A locations.



Looking north along the vacant property at 5 discrete sample B locations.



East Euclid (cont'd)

1014 East Euclid – Vacant property located on the south side of East Euclid St and at the corner of East Euclid and Cameron St.

Looking southwest along the vacant property at 5 discrete sample A locations.



Looking northwest along the vacant property at 5 discrete sample B locations.



East Euclid (cont'd)

1016 Melbourne – Vacant property located on the south side of Melbourne St and at the corner of Melbourne and Cameron St.

Looking south along the vacant property at 10 total of discrete sample B and A locations, respectively.



East Euclid (cont'd)

998 Melbourne – Vacant property located on the south side of Melbourne St and in between two other vacant lots.

Looking south along the vacant property at 10 total of discrete sample B and A locations, respectively.



East Euclid (cont'd)

990 Melbourne – Vacant property located on the south side of Melbourne St and directly to the west of the vacant property at 998 Melbourne.

Looking south along the vacant property at 5 discrete sample A locations.



Looking west along the vacant property at 3 of the 5 discrete sample B locations.



Looking north along the vacant property at 3 of the 5 discrete sample B locations. One location repeated in photo.



East Euclid (cont'd)

987 Melbourne – Vacant property located on the north side of Melbourne St and to the west of another vacant property.

Looking northeast along the vacant property at 5 discrete sample A locations. Sample B locations further to the north. 1 location is not seen in the photo because it is to the southeast of the car.



Looking north along the vacant property at 5 discrete sample B locations. 2 locations located behind the leaf/straw pile so they are not in seen in the photo.



East Euclid (cont'd)

8435 St Aubin – Greenway of a vacant property on the corner of Denton St and St Aubin. It is located to the north of Denton St and across the street and to the east of the American Axle Facility at 8435 St Aubin. A separate greenway also sampled is located to the south of Denton St and also across the street and to the east of 8435 St Aubin.

Looking northwest along the vacant property at 10 total discrete sample A and B locations, respectively.



Looking northwest along the greenway at 10 total discrete sample C and D locations, respectively.



East Euclid (cont'd)

8434 Lumpkin – Greenway located to the east of Lumpkin St in front of a fenced in lot and to the south of the property at 8434 Lumpkin.

Looking south along the greenway at 5 discrete sample A locations.



Looking north along the greenway at 5 discrete sample B locations.



East Euclid (cont'd)

1901 Marston – Greenway located on the east side of Morrow St and on the corner of Morrow and Marston St. On the west side of the greenway is Wessel Co, an abandoned Factory. Another greenway located on the east side of Morrow St and across the street from an American Axle Plant gated drive.

Looking southeast along the greenway at 5 discrete sample A locations.



Looking northeast along the greenway at 5 discrete sample B locations.



East Euclid (cont'd)

1901 Marston (cont'd)

Looking northeast along the greenway at 10 total discrete sample C and D locations, respectively.



East Euclid (cont'd)

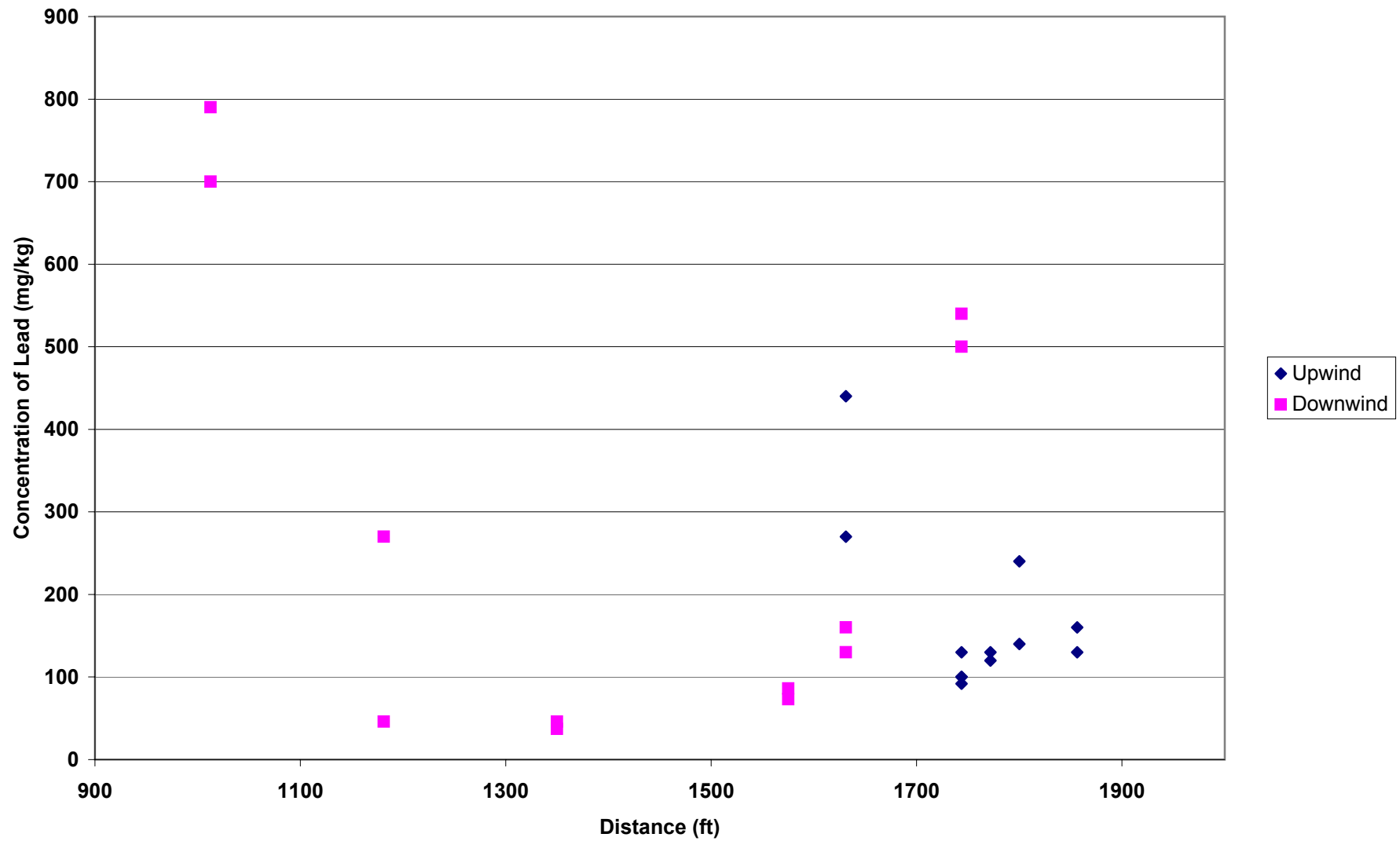
1831 Clay – Greenway located on the west side of Morrow St and to the east of an enclosed property at 1831 Clay, located on the corner of Clay and Morrow St.

Looking southeast along the greenway at 10 total discrete sample B and A locations respectively.



ATTACHMENT E
CONCENTRATION GRAPH

1640 East Euclid



Great Lakes

*** Linear Model ***

Call: lm(formula = Lead.ppm ~ Location + Distance + Distance:Location, data =
GreatLakes, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-308.8	-86.34	-46	80.66	382.4

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	1663.9577	1513.5062	1.0994	0.2846
Location	-939.6765	1548.5366	-0.6068	0.5508
Distance	-0.8493	0.8604	-0.9872	0.3354
Distance:Location	0.5365	0.8900	0.6029	0.5534

Residual standard error: 203.9 on 20 degrees of freedom

Multiple R-Squared: 0.1878

F-statistic: 1.542 on 3 and 20 degrees of freedom, the p-value is 0.2346

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	73261.5	73261.5	1.762245	0.1992993
Distance	1	103924.1	103924.1	2.499808	0.1295462
Distance:Location	1	15110.7	15110.7	0.363475	0.5533585
Residuals	20	831456.3	41572.8		

*** Linear Model ***

Call: lm(formula = LogLead ~ Distance + Location + Location:Distance, data =
GreatLakes, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-1.528	-0.4877	-0.02754	0.4326	1.371

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	10.8553	6.5704	1.6522	0.1141
Distance	-0.0033	0.0037	-0.8880	0.3851
Location	-5.0657	6.7224	-0.7536	0.4599
Location:Distance	0.0028	0.0039	0.7336	0.4717

Residual standard error: 0.8851 on 20 degrees of freedom

Multiple R-Squared: 0.05113

F-statistic: 0.3592 on 3 and 20 degrees of freedom, the p-value is 0.7831

Analysis of Variance Table

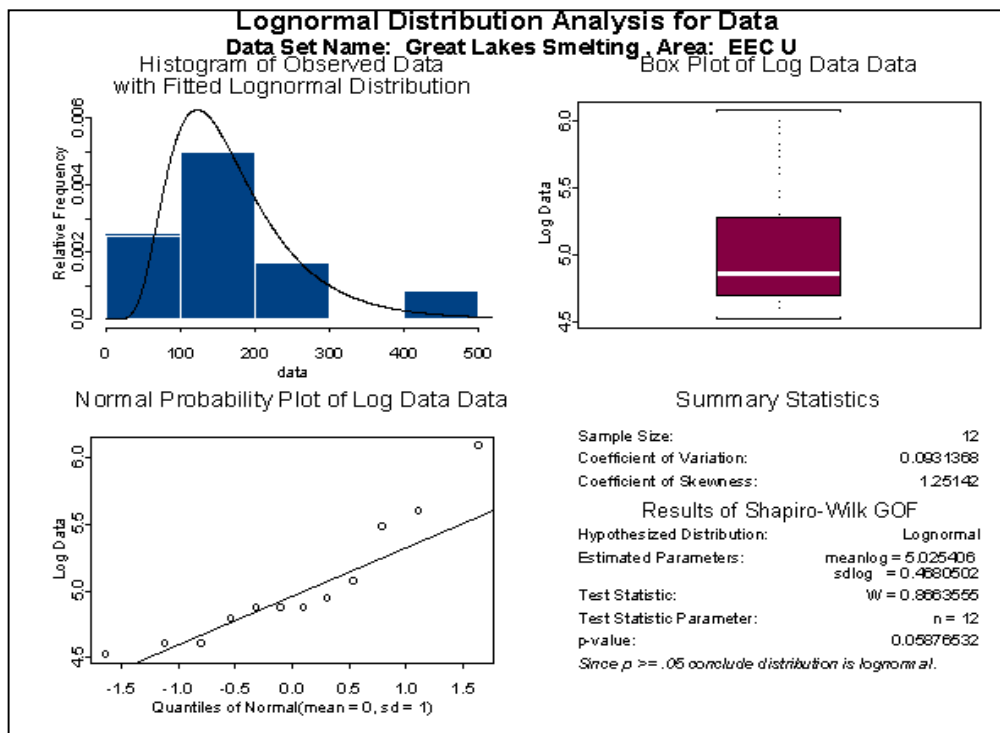
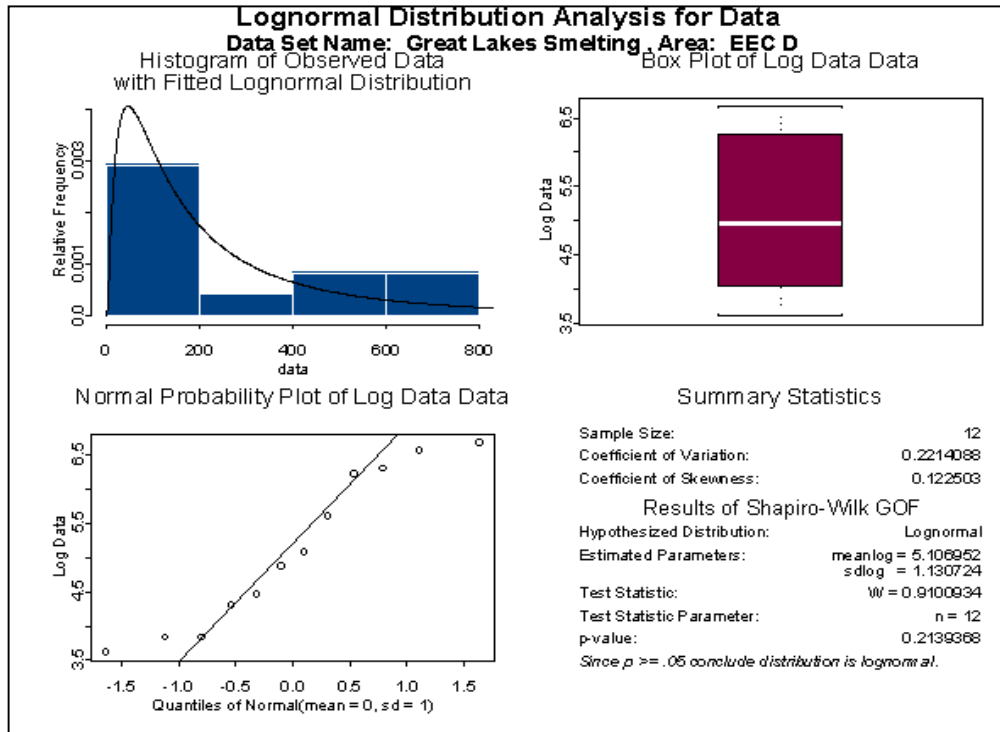
Response: LogLead

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Distance	1	0.35144	0.3514445	0.4485785	0.5106701
Location	1	0.07122	0.0712197	0.0909038	0.7661438
Location:Distance	1	0.42167	0.4216677	0.5382103	0.4716885
Residuals	20	15.66925	0.7834627		

ATTACHMENT F
STATISTICAL DISTRIBUTION

GREAT LAKES SMELTING STATISTICAL DISTRIBUTION



Appendix C

Acme Metal Company Phase I Summary Report

**DRAFT
PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
ACME METAL COMPANY – 1436 HOLBROOK STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDATION AND REDEVELOPMENT DIVISION**
Detroit Field Office – Cadillac Place
Suite 2-300
3058 West Grand Boulevard
Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.
2501 Jolly Road
Suite 100
Okemos, Michigan 48864

February 2004

W. O. No. 20083.028.001

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Acme Metal Company (the Facility), 1436 Holbrook Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at the adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 10 and 11 November 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from Facility during historic smelting operations. However, to be certain that the conclusions are based on enough data it is recommended that additional soil samples be collected from additional properties located within 1,000 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition occurred and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning):
- Interview past employees regarding historical Facility operations;
- Perform a Facility walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

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LIST OF ATTACHMENTS

Title

Attachment A	Figures
Attachment B	Tables
Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Acme Metal Company (the Facility) – 1436 Holbrook Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Sampling Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Summary Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E** – Concentration Graph, and
- **Attachment F** – Statistical Distribution.

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 1436 Holbrook Street in Hamtramck, Wayne County, Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility appears to be located in a grass covered open area west of the American Axle parking lot. The property is enclosed with a black iron fence. The area five blocks north and east of the Facility is both industrial and commercial with residential use to the northeast. The area five blocks south of the Facility is the American Axle Plant. The area five blocks west of the Facility is residential.

2.1.2 Site History

A review of the Bresser's directory indicated that Holbrook Rubber Company and Reliable Metal Company co-owned the property from 1946 to 1951. The Facility owned the property from 1960 to 1971. There are no listings for the address from 1981 to the present.

Review of the Sanborn maps for this address show the following chronology: 1951 metal junk yard present with smelting furnace, 1968 metal junk yard present, 1971 metal junk yard present, and 1997 to 2002 vacant lot.

The aerial photograph review indicated this area was industrialized from 1957 to the present. Structures identified from the most recent aerial photograph (2003 GlobeXplorer™) include a paved parking area in the southeast corner with the remaining property maintained as an empty lot. The property is currently vacant with light residential use within 600 feet (ft.) to the west and heavy residential use approximately 600 ft. to the northeast. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the fire records, two permits were located for repairs caused by fire damage in the Brick and Metal Storage and Smelting area along with Scrap Metal Warehouse and Junkyard.

Review of the BEA for the properties located north of the address indicates that lead was detected that exceeded the MDEQ Part 201 Residential Direct Contact Criteria (RDCC).

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter-related releases were present off-site and could be attributed to the Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for the Facility.

Prior to sample collection, upwind and downwind sampling areas were established, 1,500 and 4,400 ft. from the Site, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from City and/or State owned properties located within these established areas.

The City or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual city or state owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, and photo documentation) were conducted as described in the “*Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project.*” Because 12 City and/or State owned parcels were not available in the sample radius for the Facility, WESTON collected samples from six City and/or State owned parcels in the upwind direction and six greenways in the downwind direction near the Facility. Two composite samples were collected from each of the six downwind greenways

and each of the six upwind parcels. A total of 24 composite samples were collected from the area upwind and downwind of the former smelter and are shown on the sample sketches included in **Attachment A**.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky, Ms. Amanda Freeman, Ms. Shamille Lewis, and Mr. Erik Martinson conducted field sampling on 10 and 11 November 2003. Since City and/or State owned parcels were not available in the downwind direction, WESTON selected greenways, prior to the sampling event, and submitted them to the City of Hamtramck to obtain their approval and access. When greenways were not located on the same street as the mailing address of the nearest building, the number of the building was used in conjunction with the street of the greenway. For example, a building located on 2620 Holbrook Street with an adjacent greenway located on Brombach Street, would be identified as BRO – 02620. These changes were noted in the logbook and can be viewed on the “Summary Table For Sample Properties” (**Attachment B**) and the sample sketches (**Attachment A**). WESTON collected samples from six upwind City and/or State owned parcels and six downwind greenways. Two composite samples were collected from each of the 12 locations. Twenty four soil samples submitted for analysis. Five samples were designated as an matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- 12 composite soil samples in the downwind direction.

Sample locations from both the upwind and downwind areas are listed in **Table 1** included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. Two samples collected from properties upwind of the former Facility contained concentrations of lead above the project screening level (400 milligrams per kilogram [mg/kg]) established in the Phase I QASP. Five samples collected from properties downwind of the former Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	2	59-470
Downwind	12	5	160-680
Total	24	7	59-680

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were chosen based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the City of Detroit Metropolitan Area. If smelting operations occurred, lead in soil resulting from aerial deposition would be detected downwind in the northeast direction from the Facility. Parcels ranging from 900 ft. to 1,500 ft. were selected southwest in the upwind direction of the Facility. Parcels ranging from 2,300 ft. to 4,400 ft. were chosen northeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. Elevated lead concentrations were found in the upwind and downwind direction of the former Facility. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus, the Phase I investigation was designed to determine if an off-site airborne release has occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind envelope.

To determine the distribution of the lead concentrations in soils as the distance from the Facility site increases, WESTON evaluated the lead concentration of samples versus the distance from the Facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated low concentrations of lead in the upwind direction with the exception of two samples both located on a vacant lot. Elevated levels of lead are found in the downwind direction but do not show any clear indication of a decreasing concentration, a condition that would be expected if an aerial release of lead had occurred due to smelting operations. These conclusions were confirmed by a linear regression of the concentrations versus distance data

(**Attachment E**). Review of the sketches and photographs showing sampling locations do not reveal any industry in the area which would explain the elevated presence of lead, but does show the sampling locations are very close to both buildings, curbs, and fire hydrants all of which could have been painted with lead paint in the past. These conclusions were confirmed by a linear regression of the concentration versus distance data (**Attachment E**).

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind log mean is 5.1 mg/kg and the upwind mean is 5.0 mg/kg indicating the concentrations downwind and upwind are similar. Comparison of the relative frequency histogram (**Attachment F**) for the downwind and upwind data indicates a higher frequency of occurrence for both data sets between 0 and 200 mg/kg and a greatly decreasing frequency above 300 mg/kg also indicating the data are similar data sets. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently like to each other both in mean concentration and distribution to conclude that the data represent the same conditions.

4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility does not suggest that lead contamination detected in downwind locations is attributable to aerial deposition from historic smelting operations at the Facility. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U.S. EPA 1994, as amended. Samples collected from upwind of the Facility did contain concentrations of lead above the screening level but do not appear to be consistent with other lower levels found at other upwind locations. Additionally, the downwind samples show no clear trend of decreasing concentration with increasing distance with levels of lead starting under 200 mg/kg and rising to 680 µg/kg approximately 3,800 ft. from the Facility. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from the Site during historic smelting operations at the Facility.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

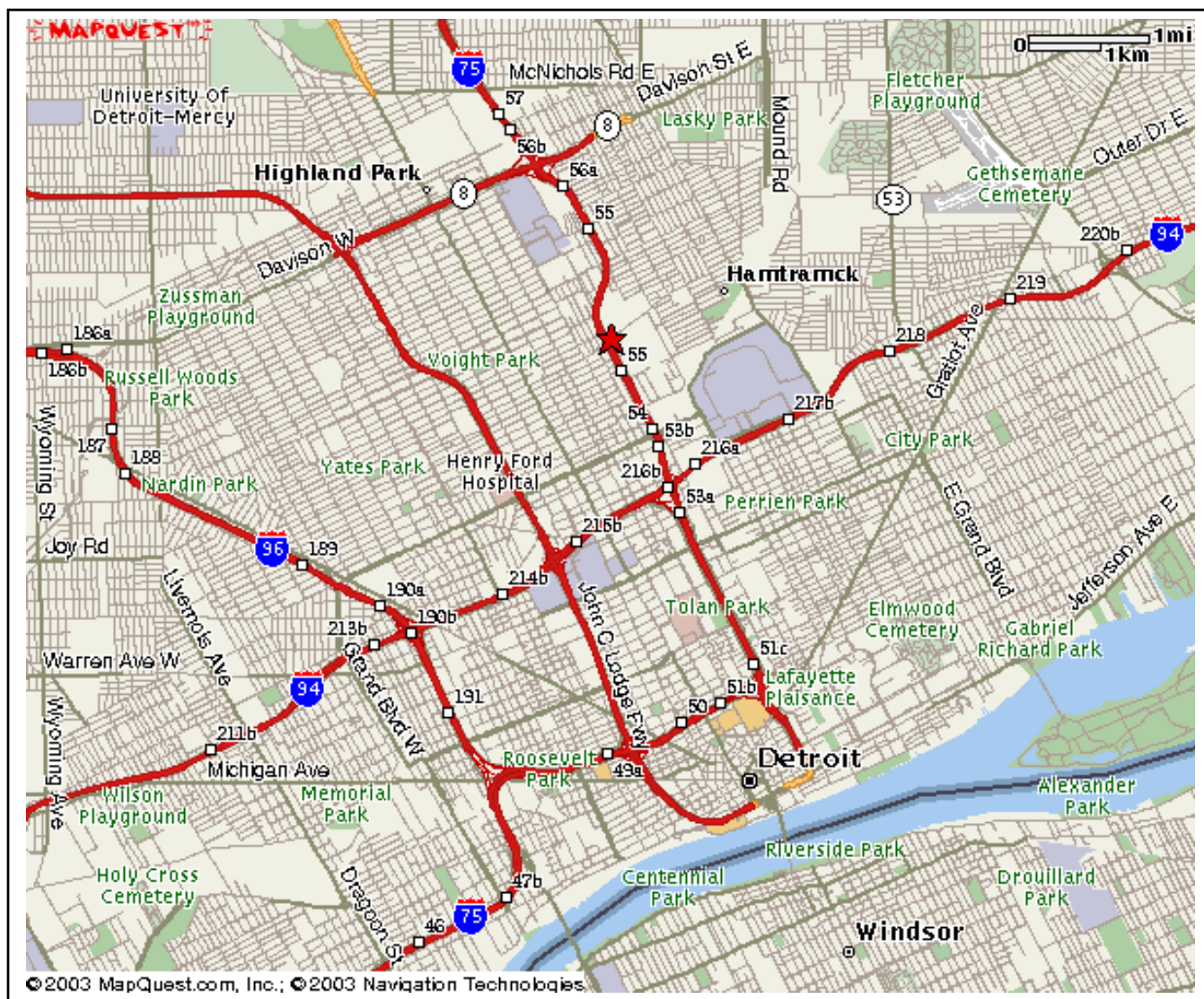
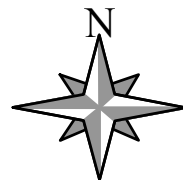
The results of this investigation do not indicate that downwind soils at properties have been impacted by releases of lead from the former Facility as a result of aerial deposition related to historic smelting operations. However, to be certain that the conclusions are based on enough data it is recommended that additional soil samples be collected from additional properties located within 1,000 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition occurred and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning):
- Interview past employees regarding historical Facility operations;
- Perform a Facility walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

ATTACHMENT A
FIGURES

FIGURE 1
Site Location Map
1436 Holbrook Street

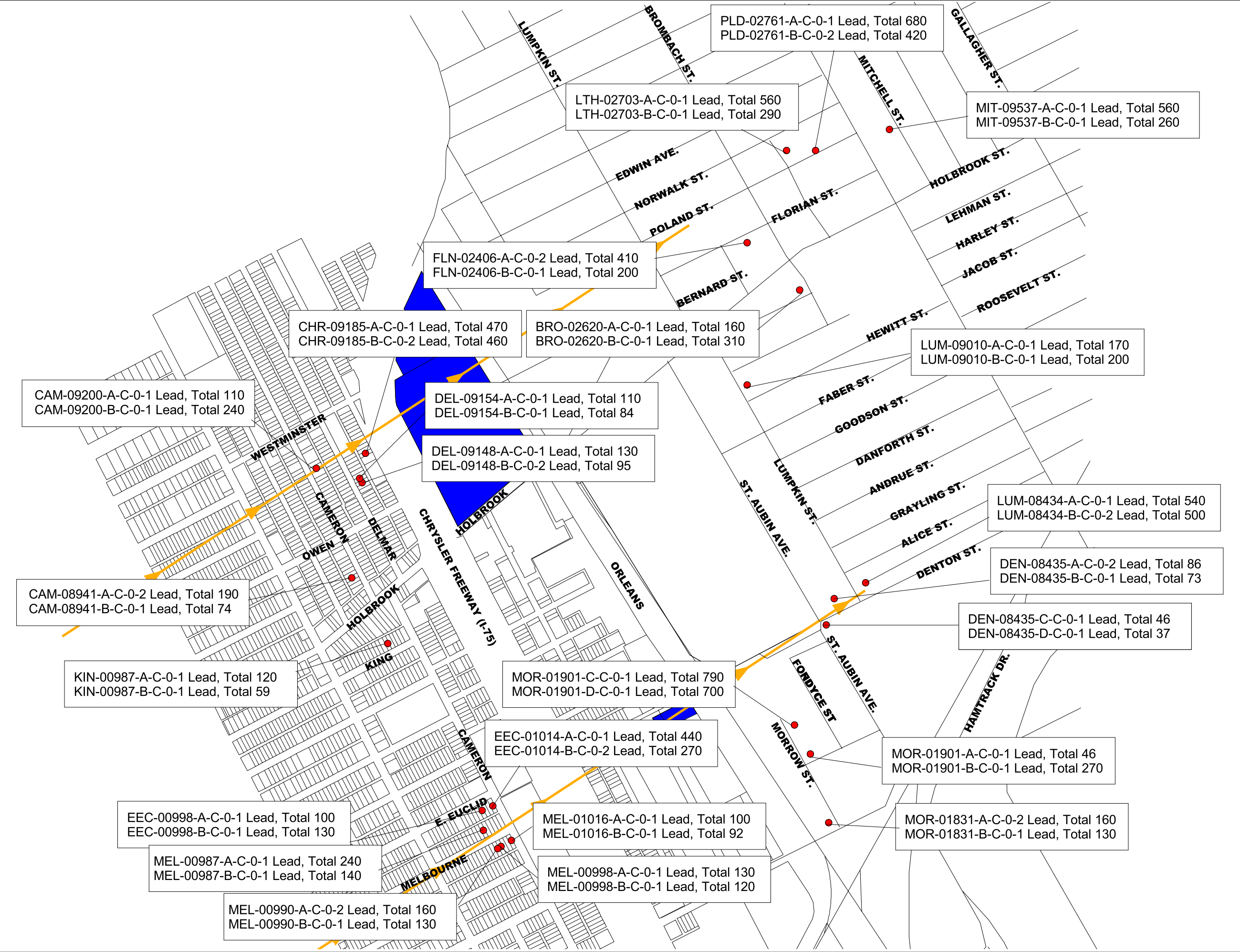


WESTON SOLUTIONS, INC. OF MICHIGAN



**300 River Place, Suite 2800
Detroit, Michigan 48207**

**Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001**



LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

Sampling Locations

Wind Direction

Parcel Boundaries and Roads (Approximate)

Facility of Concern

Note: All Lead, Total analytical results are shown in mg/kg.

N

0 700 Feet

WESTON SOLUTIONS SM

PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Analytical Results Map

Acme Metal Co
1436 Holbrook Street
Great Lakes Smetling
1640 E. Euclid Street

WORK ORDER No.: 20083.028.001	PROJECT MANAGER:
DRAWN BY: JLT	CHECKED BY:
DRAWING NAME:	DIRECTORY/ FOLDER: JTID\DLAP\apr09_09_03_apr
CONTRACT No.:	DELIVERY ORDER No.:
SCALE:	REPORT DATE:
DATE: January 2004	REVISION No.:
	FIGURE No.: 2

ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
2620 Holbrook	Greenway located to the southwest of Brombach St across from the Hamtramack Senior Plaza and to the northeast of an enclosed parking lot.	BRO-02620-A-C-0-1
		BRO-02620-B-C-0-1
9010 Lumpkin	Greenway located to the east of Lumpkin St and at the corner of Lumpkin and Wyandotte St.	LUM-09010-A-C-0-1
		LUM-09010-B-C-0-1
2406 Florian	Greenways located to the south of Florian St and in front of houses 2406, 2412, & 2420 Florian.	FLN-02406-A-C-0-2
		FLN-02406-B-C-0-1
2703 Latham	Greenways located to the east of Latham St in front of house at 2703 Latham and in front of enclosed yard at house to the north of 2703.	LTH-02703-A-C-0-1
		LTH-02703-B-C-0-1
2761 Poland	Greenways located to the south of houses at 2761, 2755, 2747, & 2743 Poland and to the north of Poland St.	PLD-02761-A-C-0-1
		PLD-02761-B-C-0-2
9537 Mitchell	Greenways located to the west of Mitchell St and to the east of houses at 9537, 9521, 9519, & 9515 Mitchell.	MIT-09537-A-C-0-1
		MIT-09537-B-C-0-1
Downwind Properties		
Address	Description	Sample Identification
8941 Cameron	Vacant property located on the west side of Cameron St and surrounded by vacant properties.	CAM-08941-A-C-0-2
		CAM-08941-B-C-0-1
9200 Cameron	Vacant property located on the northeast side of Cameron St and surrounded by vacant properties.	CAM-09200-A-C-0-1
		CAM-09200-B-C-0-1
9148 Delmar	Vacant property located to the northeast of Delmar St and to the east of vacant property at 9154 Delmar.	DEL-09148-A-C-0-1
		DEL-09148-B-C-0-2
9154 Delmar	Vacant property located to the northeast of Delmar St and to the east of house at 9160 Delmar.	DEL-09154-A-C-0-1
		DEL-09154-B-C-0-1
987 King	Vacant property located on the north side of King St and surrounded by vacant properties.	KIN-00987-A-C-0-1
		KIN-00987-B-C-0-1
9185 Chrysler	Vacant property located on the west side of Chrysler Dr, to the north of a fenced parking lot, and to the south of a dirt parking area of a house at 9191 Chrysler.	CHR-09185-A-C-0-1
		CHR-09185-B-C-0-2

*Notes:

Greenway identifiers were taken from the street the greenway was parallel to and not the actual street to which the property belonged.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
8941 Cameron	CAM-08941-A-C-0-2	190
8941 Cameron	CAM-08941-B-C-0-1	74
9200 Cameron	CAM-09200-A-C-0-1	110
9200 Cameron	CAM-09200-B-C-0-1	240
9148 Delmar	DEL-09148-A-C-0-1	130
9148 Delmar	DEL-09148-B-C-0-2	95
9154 Delmar	DEL-09154-A-C-0-1	110
9154 Delmar	DEL-09154-B-C-0-1	84
987 King	KIN-00987-A-C-0-1	120
987 King	KIN-00987-B-C-0-1	59
9185 Chrysler	CHR-09185-A-C-0-1	470
9185 Chrysler	CHR-09185-B-C-0-2	460
Downwind		
2620 Holbrook	BRO-02620-A-C-0-1	160
2620 Holbrook	BRO-02620-B-C-0-1	310
9010 Lumpkin	LUM-09010-A-C-0-1	170
9010 Lumpkin	LUM-09010-B-C-0-1	200
2406 Florian	FLN-02406-A-C-0-2	410
2406 Florian	FLN-02406-B-C-0-1	200
2703 Latham	LTH-02703-A-C-0-1	560
2703 Latham	LTH-02703-B-C-0-1	290
2761 Poland	PLD-02761-A-C-0-1	680
2761 Poland	PLD-02761-B-C-0-2	420
9537 Mitchell	MIT-09537-A-C-0-1	560
9537 Mitchell	MIT-09537-B-C-0-1	260

*Notes

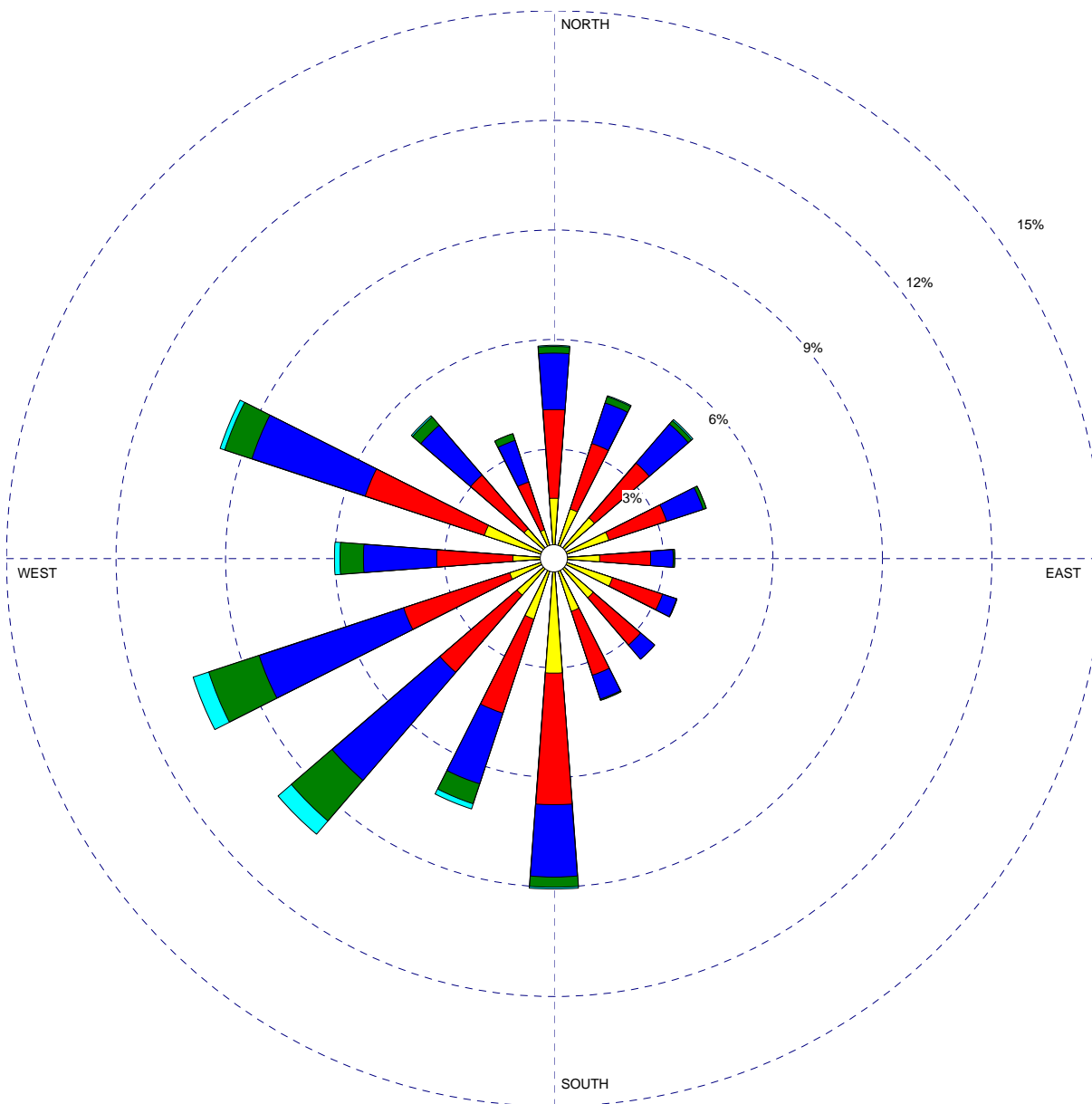
1) Bold Indicates results equal to or greater than to 400 mg/kg.

ATTACHMENT C

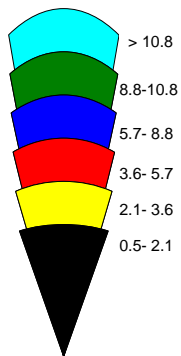
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

ATTACHMENT F
STATISTICAL DISTRIBUTION

CLIENT/SUBJECT Holbrook W.O. NO. _____

TASK DESCRIPTION 2620 BROMBACH A+B TASK NO. _____

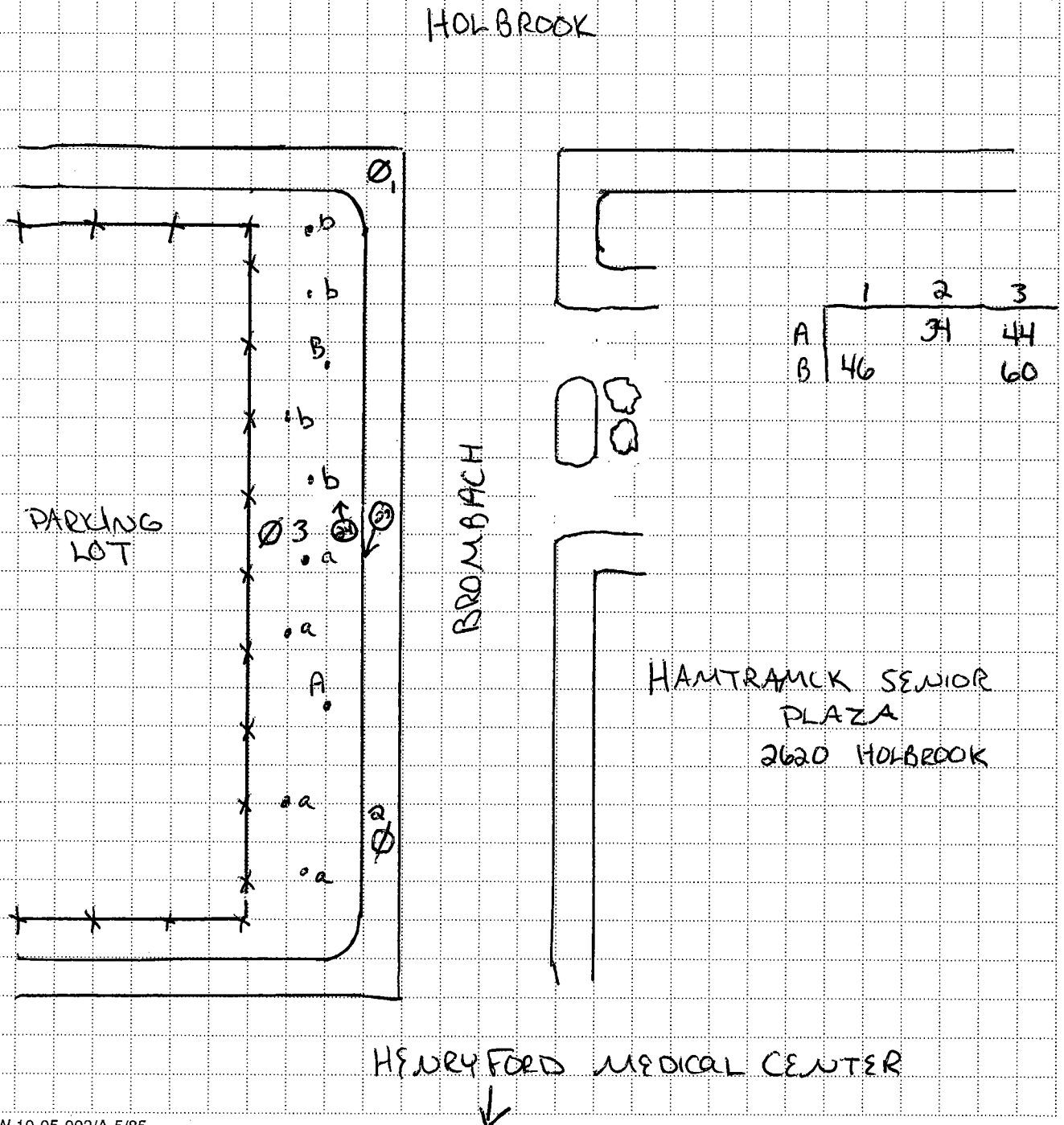
PREPARED BY A. Freeman DEPT _____ DATE 11-11-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	

DEPT _____	DATE _____



CLIENT/SUBJECT HOLBROOK

W.O. NO. ____

TASK DESCRIPTION LUM-09010-A-B

TASK NO. ____

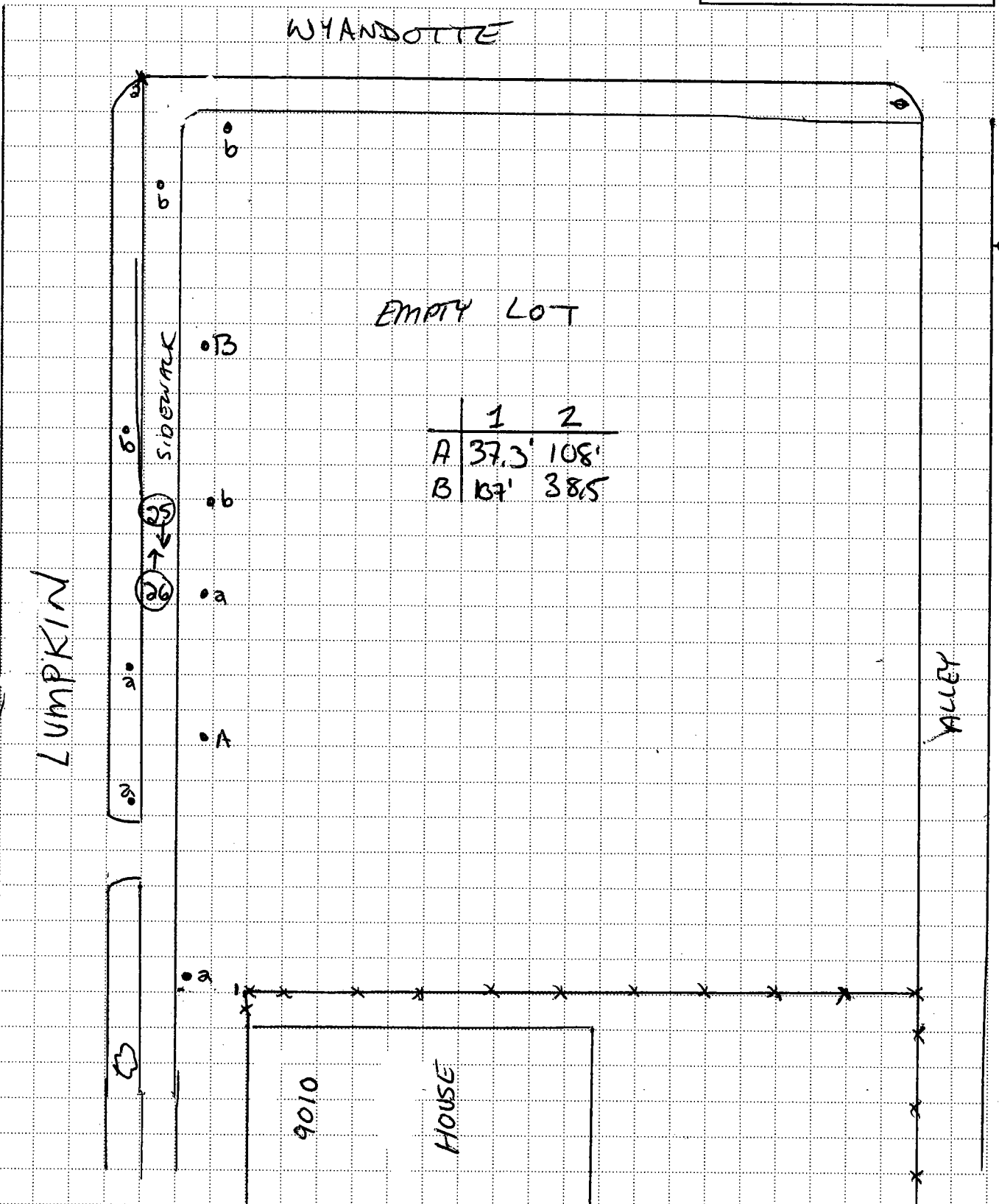
PREPARED BY R. Nemecovsky DEPT ____ DATE 11/11/03

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY	
DEPT ____	DATE ____

N



CLIENT/SUBJECT HOLBROOK W.O. NO. _____

TASK DESCRIPTION 2406 FLORIAN (FLN) - A+B TASK NO. _____

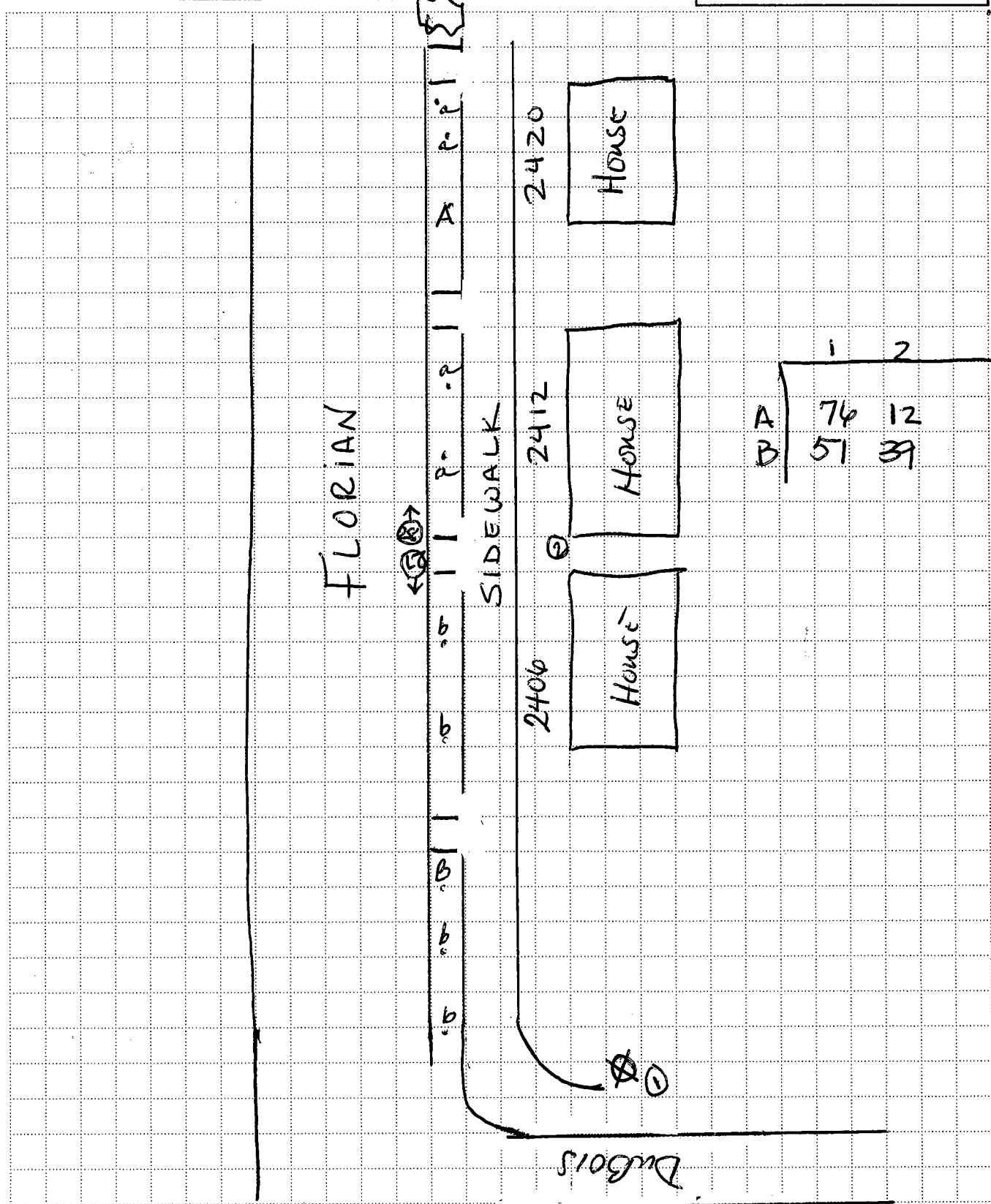
PREPARED BY S. Lewis DEPT _____ DATE 11/11/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____

← N



CLIENT/SUBJECT Holbrook W.O. NO. _____

TASK DESCRIPTION PLD - 02761 A+B TASK NO. _____

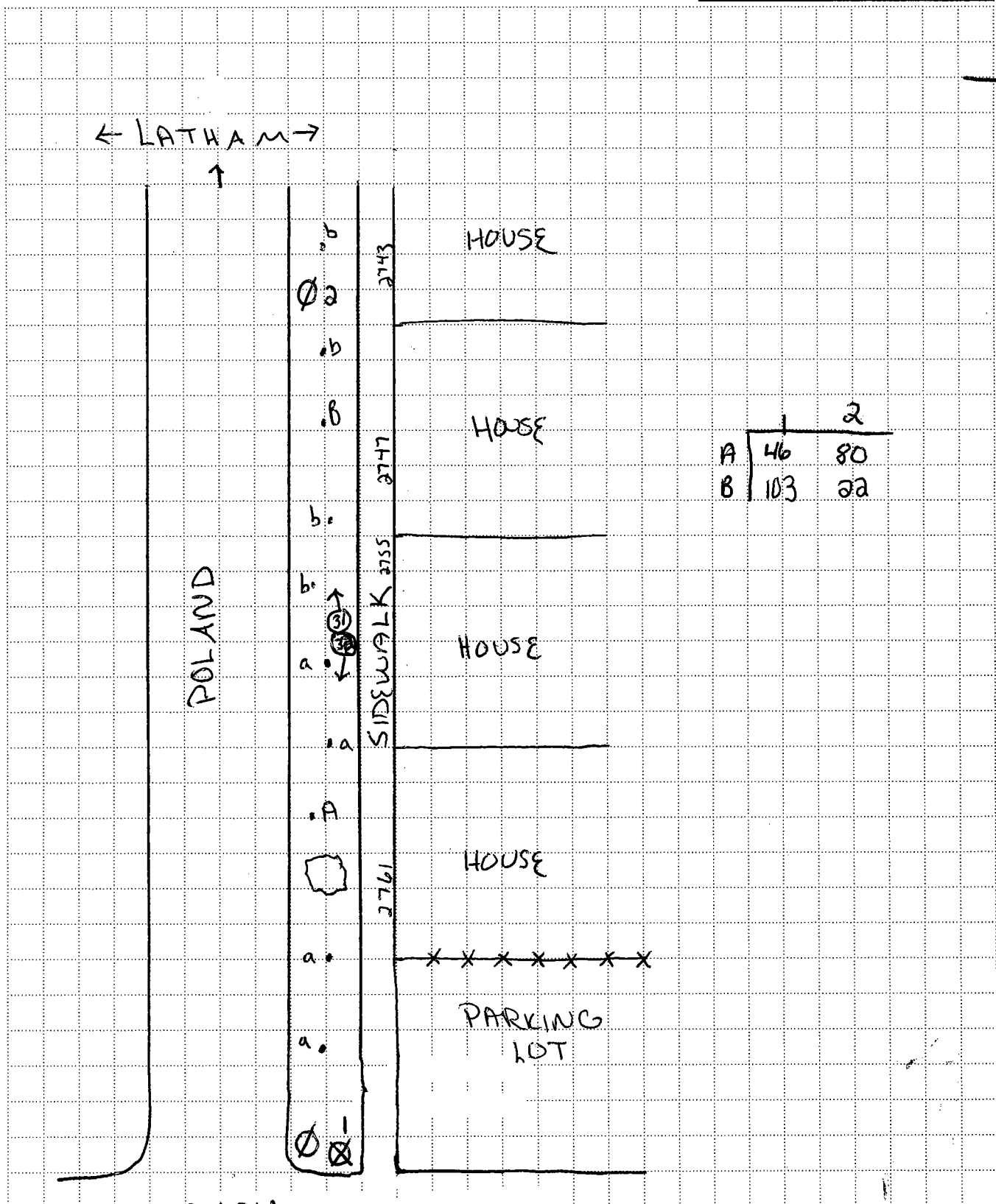
PREPARED BY A. Freeman DEPT _____ DATE 11-11-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____

DEPT _____ DATE _____



	1	2
A	46	80
B	103	22

CLIENT/SUBJECT HOLBROOK

W.O. NO. ____

TASK DESCRIPTION MIT - 09537 A+B

TASK NO. ____

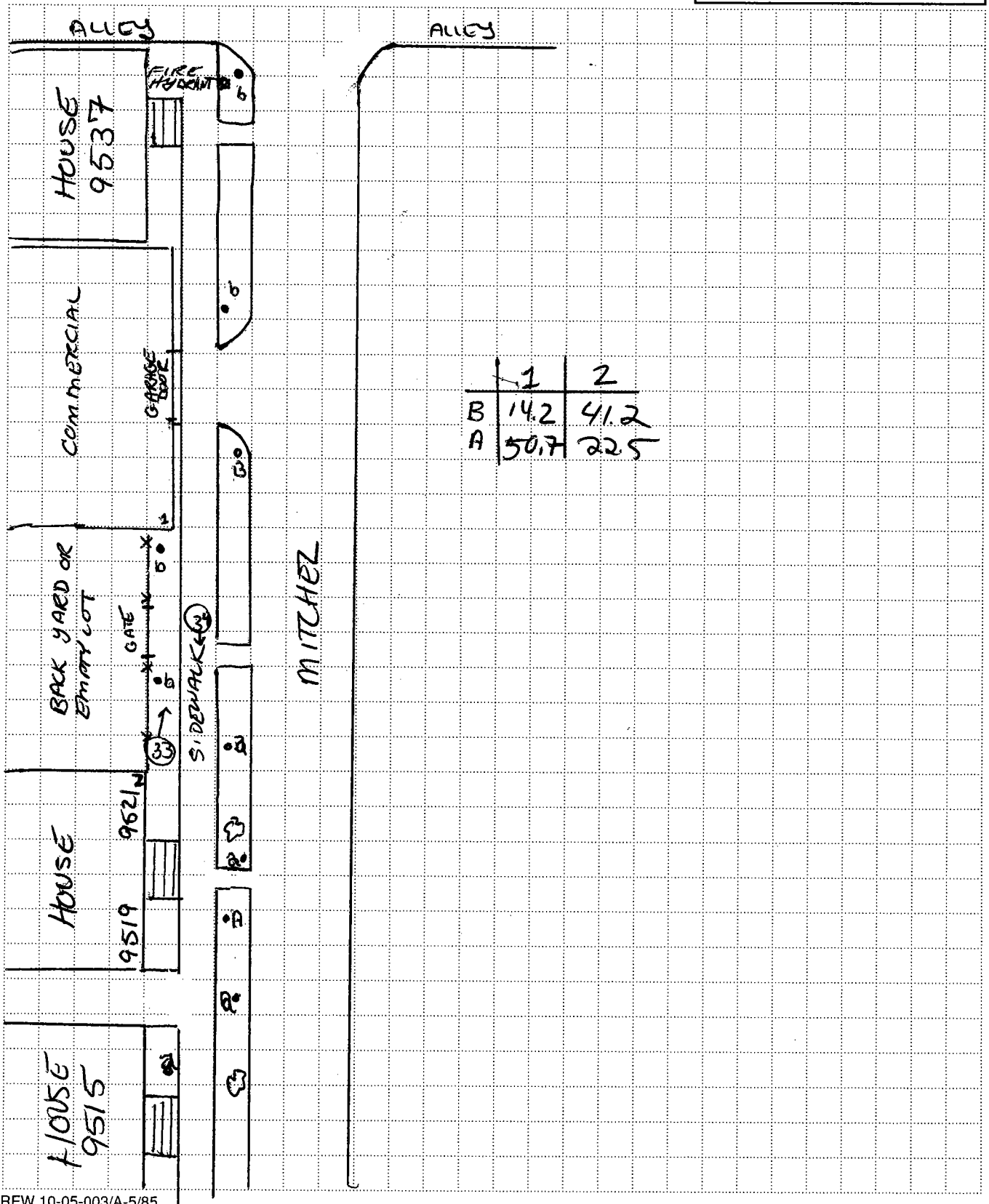
PREPARED BY R. Nemlensky

DEPT ____ DATE 11/11/03

MATH CHECK BY ____ DEPT ____ DATE ____

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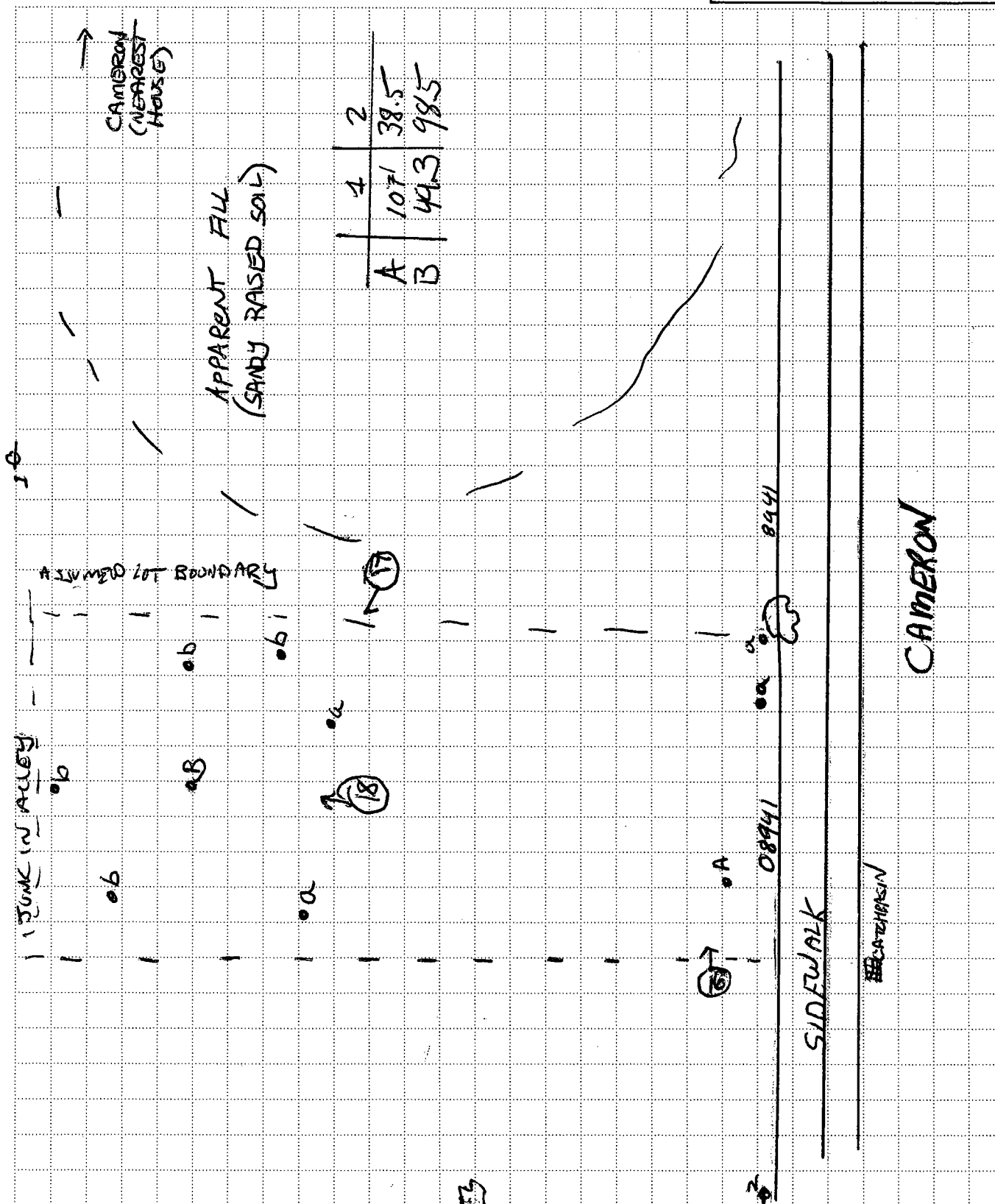
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PREPARED BY R. Nemirovsky DEPT _____ DATE 11/10/07

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT HOLBROOK W.O. NO. _____

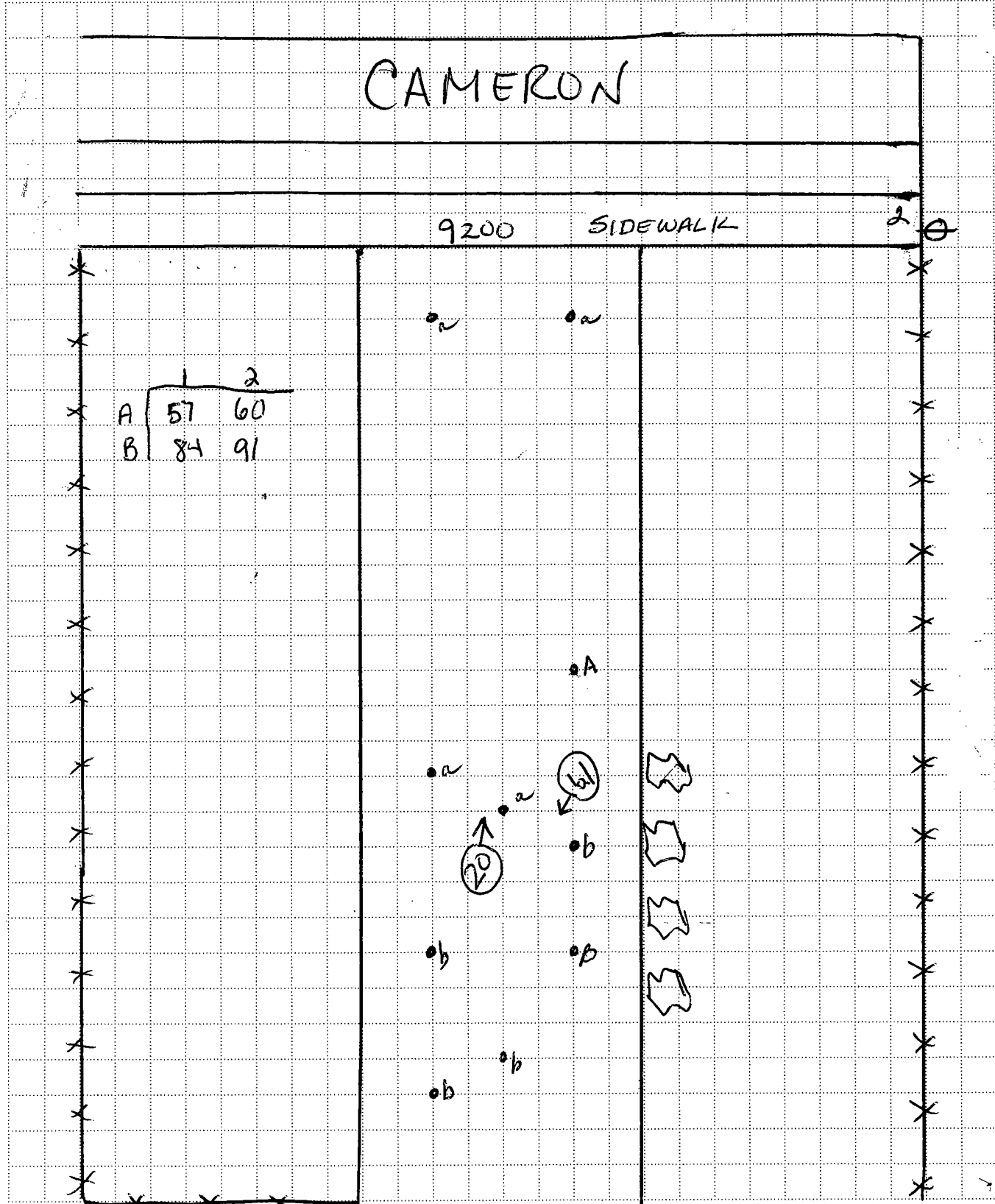
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PREPARED BY S. LEWIS DEPT _____ DATE 11/10/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT Holbrook 9148 DELMAR W.O. NO. _____

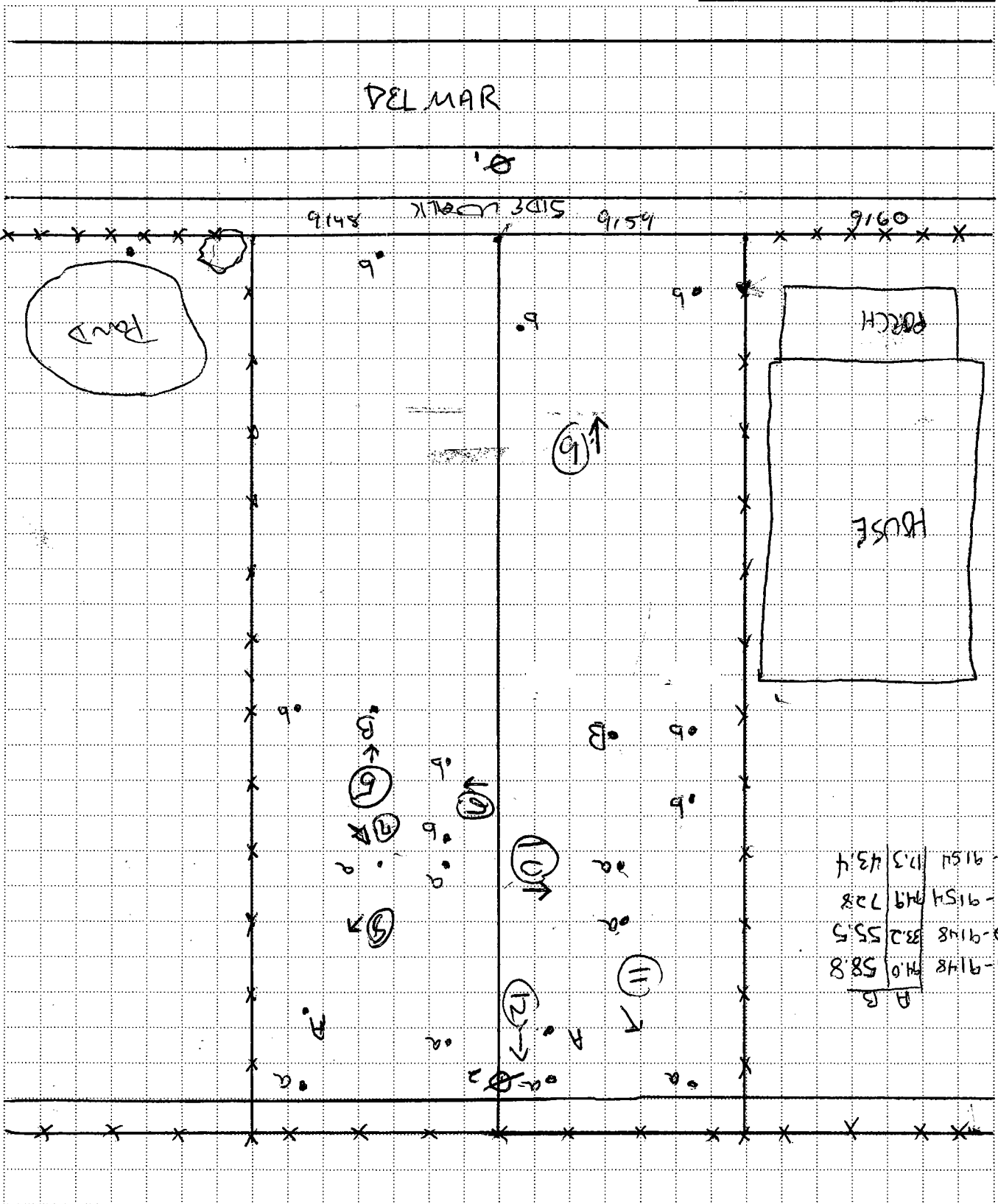
TASK DESCRIPTION DEL-09148-A-C-0-1 and DEL-09154^{ARB} TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-10-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

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DEPT _____	DATE _____



CLIENT/SUBJECT Holbrook W.O. NO. _____

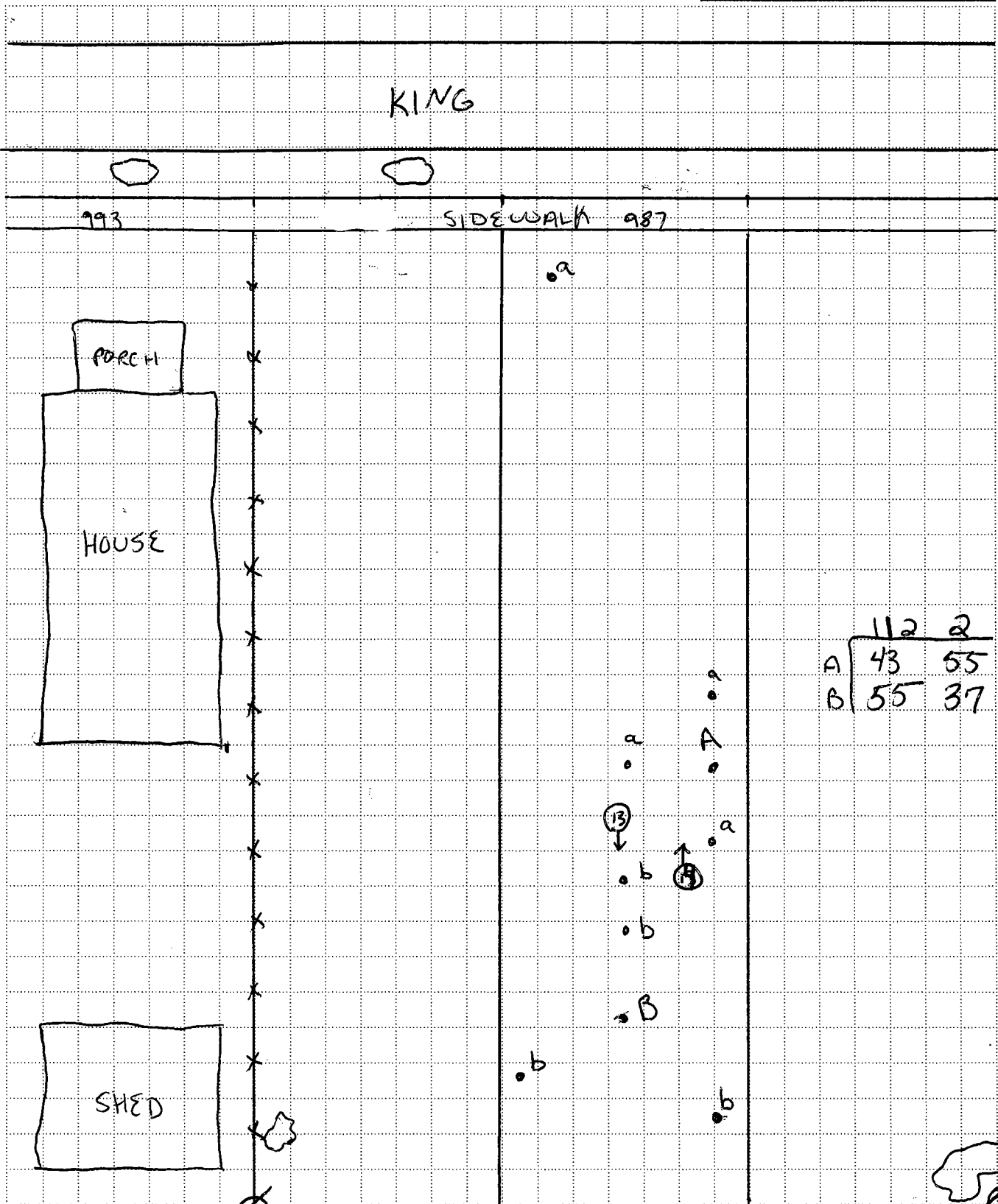
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MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

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CLIENT/SUBJECT HOLBROOK W.O. NO. _____

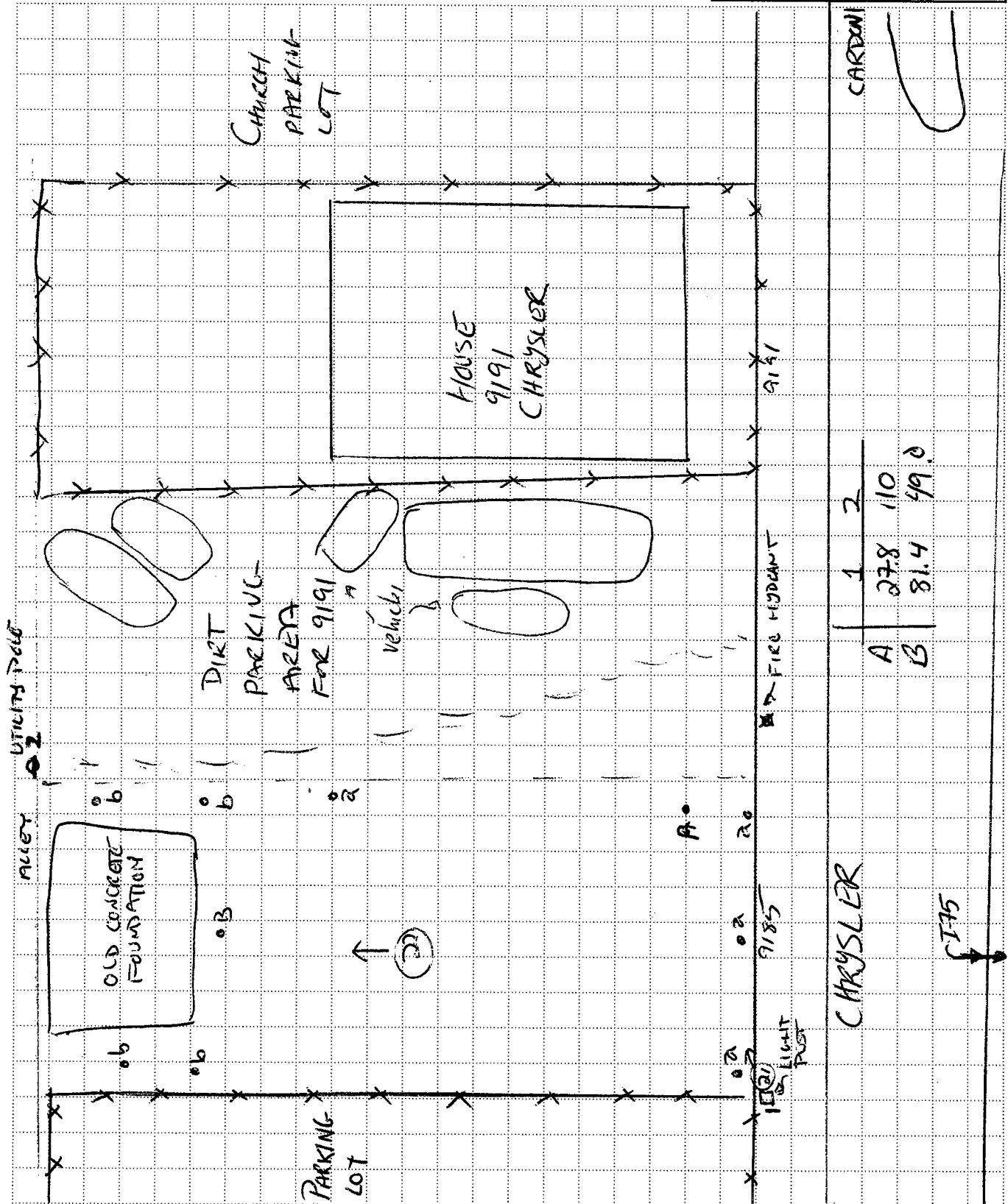
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PREPARED BY R. NEMIROVSKY DEPT _____ DATE 11/10/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



Former Acme Metal Company – 1436 Holbrook

2620 Brombach – Greenway located on the southwest side of Brombach St across from the Hamtramck Senior Plaza and to the northeast of an enclosed parking lot.

Looking south along greenway at 5 discrete sample A locations.



Looking northwest along greenway at 5 discrete sample B locations.



Holbrook (cont'd)

9010 Lumpkin – Greenway located on the east side of Lumpkin St and directly north of the house at 9010 Lumpkin. The greenway is on the corner of Lumpkin and Wyandotte St.

Looking south along greenway at 5 discrete sample A locations.



Looking north along greenway at 5 discrete sample B locations.



Holbrook (cont'd)

2406 Florian – Greenways located to the south of Florian St and in front of houses 2406, 2412, and 2420 Florian.

Looking east along greenway at 5 discrete sample A locations.



Looking west along greenway at 5 discrete sample B locations.



Holbrook (cont'd)

2703 Latham – Greenway located on the east side of Latham St in front of house at 2703 Latham and in front of enclosed yard at house to the north of 2703 Latham.

Looking south along greenway at 5 discrete sample A locations.



Looking north along greenway at 5 discrete sample B locations.



Holbrook (cont'd)

2761 Poland – Greenways located on the north side of Poland St and to the south of houses at 2761, 2755, 2747, and 2743 Poland.

Looking east along greenway at 5 discrete sample A locations.



Looking west along greenway at 5 discrete sample B locations.



Holbrook (cont'd)

9537 Mitchell – Greenways located on the west side of Mitchell St and to the east of houses at 9537, 9521, 9519, and 9515 Mitchell.

Looking south along greenway at 5 discrete sample A locations.



Looking north along greenway at 5 discrete sample B locations.



Holbrook (cont'd)

8941 Cameron – Vacant property on the west side of Cameron St and surrounded by vacant properties.

Looking north along vacant property at 3 of 5 discrete sample A locations.



Looking southwest along vacant property at 2 of 5 discrete sample A locations.



Looking west along vacant property at 5 discrete sample B locations.



Holbrook (cont'd)

9200 Cameron – Vacant property located on the northeast side of Cameron St and surrounded by vacant properties.

Looking southwest along vacant property at 5 discrete sample A locations.



Looking east along vacant property at 5 discrete sample B locations.



Holbrook (cont'd)

9148 Delmar – Vacant property located on the northeast of Delmar St and directly east of a vacant property at 9154 Delmar.

Looking southwest and southeast, respectively, along vacant property at 5 total discrete sample A locations.



Looking north and east, respectively, along vacant property at 5 total sample B locations.



Holbrook (cont'd)

9154 Delmar – Vacant property located to the northeast of Delmar St and directly east of a house at 9160 Delmar.

Looking northwest along the vacant property at 3 of 5 discrete sample B locations and at 2 of 5 discrete sample A locations. Also looking north at 1 of 5 sample A locations.



Looking northeast along the vacant property at 2 of 5 sample A locations.



Looking southwest along vacant property at 2 of 5 discrete sample B locations.



Holbrook (cont'd)

987 King – Vacant property located on the north side of King St and surrounded by vacant properties.

Looking south along the vacant property at 5 discrete sample A locations.



Looking north along the vacant property at 5 discrete sample B locations.



Holbrook (cont'd)

9185 Chrysler – Vacant property located on the west side of Chrysler Dr, to the north of a fenced parking lot, and to the south of a dirt parking area of a house at 9191 Chrysler.

Looking northwest along vacant property at 4 of 5 discrete sample A locations.

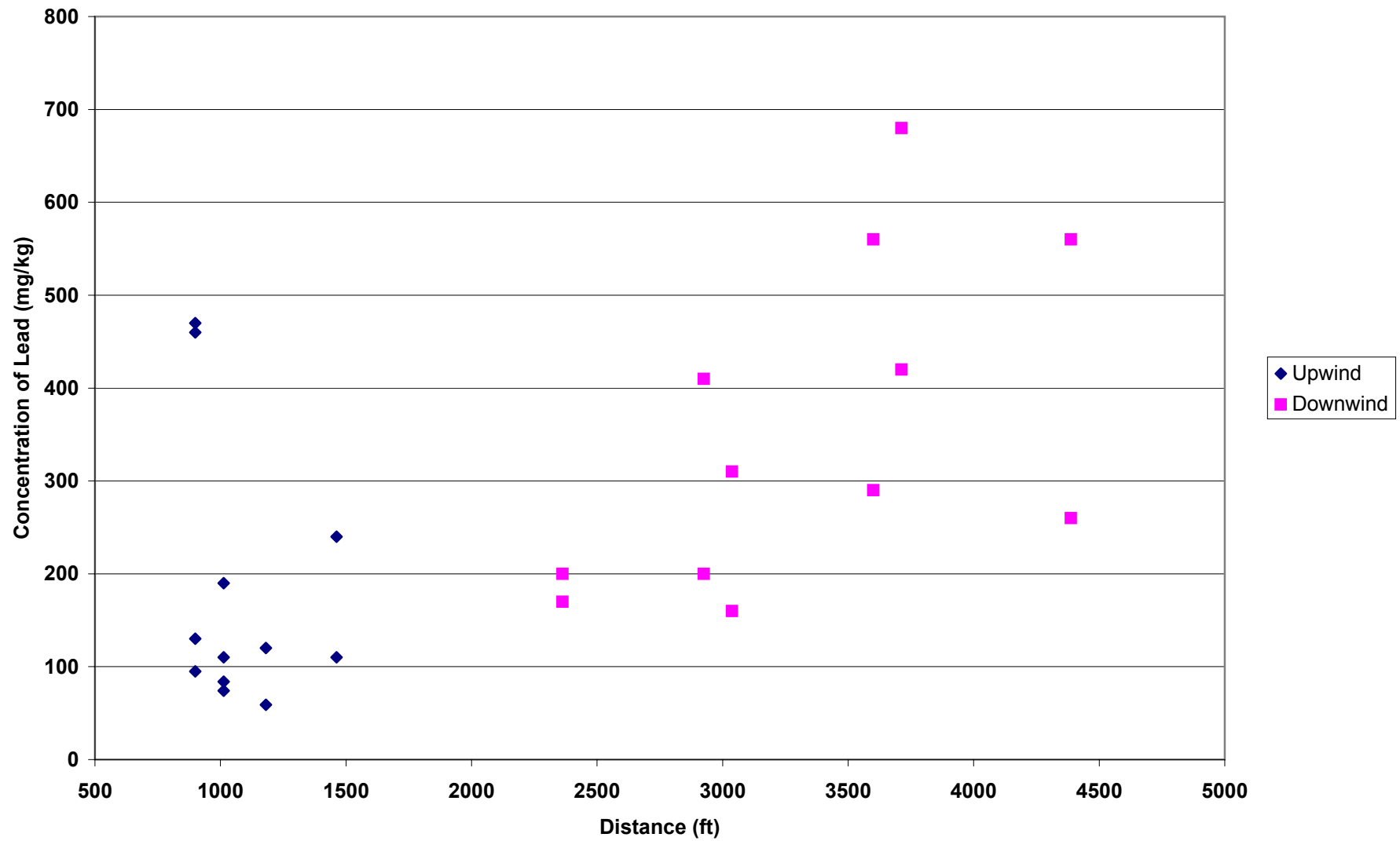


Looking west along the vacant property at 1 of 5 discrete sample A locations and 5 discrete sample B locations.



ATTACHMENT E
CONCENTRATION GRAPH

1436 Holbrook



Acme

*** Linear Model ***

Call: lm(formula = Lead.ppm ~ Location + Distance.ft + Location:Distance.ft, data = Acme, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-246.3	-100.5	-23.04	70.02	273.1

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	372.1842	237.3299	1.5682	0.1325
Location	-512.1508	325.3552	-1.5741	0.1311
Distance.ft	-0.1796	0.2166	-0.8295	0.4166
Location:Distance.ft	0.3270	0.2263	1.4450	0.1639

Residual standard error: 147 on 20 degrees of freedom

Multiple R-Squared: 0.413

F-statistic: 4.691 on 3 and 20 degrees of freedom, the p-value is 0.01225

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	179920.2	179920.2	8.321977	0.0091597
Distance.ft	1	79214.1	79214.1	3.663946	0.0700200
Location:Distance.ft	1	45145.9	45145.9	2.088167	0.1639308
Residuals	20	432397.7	21619.9		

*** Linear Model ***

Call: lm(formula = log(Lead.ppm) ~ Location + Distance.ft + Location:Distance.ft,
data = Acme, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-0.8161	-0.3428	-0.06884	0.3049	1.098

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	5.5721	0.9211	6.0495	0.0000
Location	-1.3158	1.2627	-1.0420	0.3098
Distance.ft	-0.0006	0.0008	-0.6833	0.5022
Location:Distance.ft	0.0010	0.0009	1.1640	0.2581

Residual standard error: 0.5706 on 20 degrees of freedom

Multiple R-Squared: 0.4335

F-statistic: 5.102 on 3 and 20 degrees of freedom, the p-value is 0.008761

Analysis of Variance Table

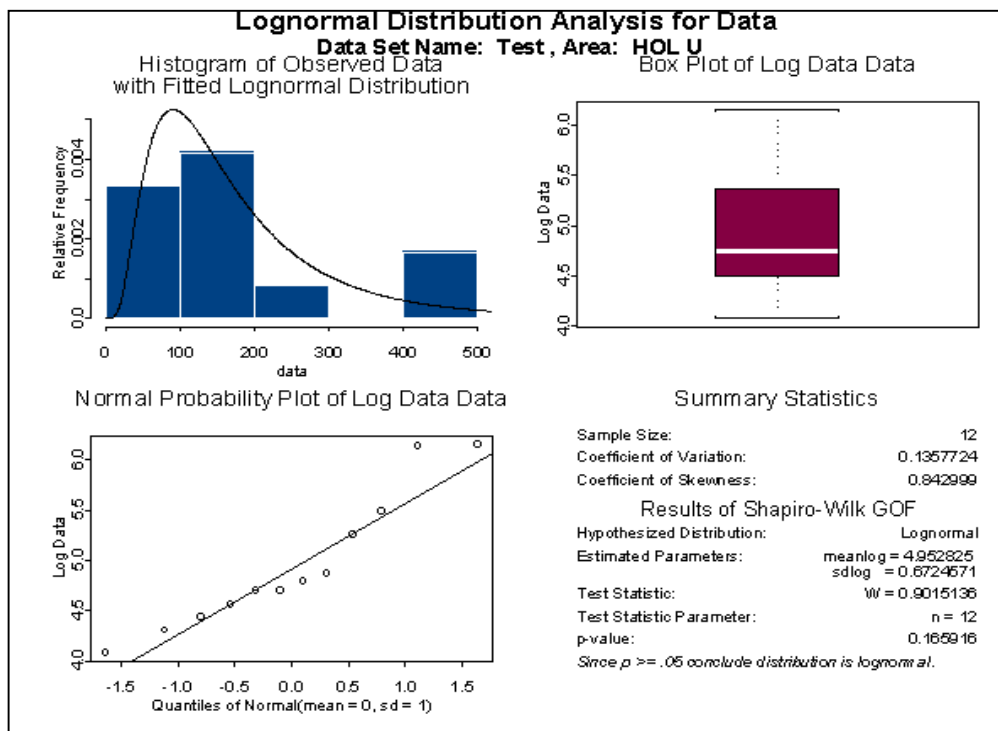
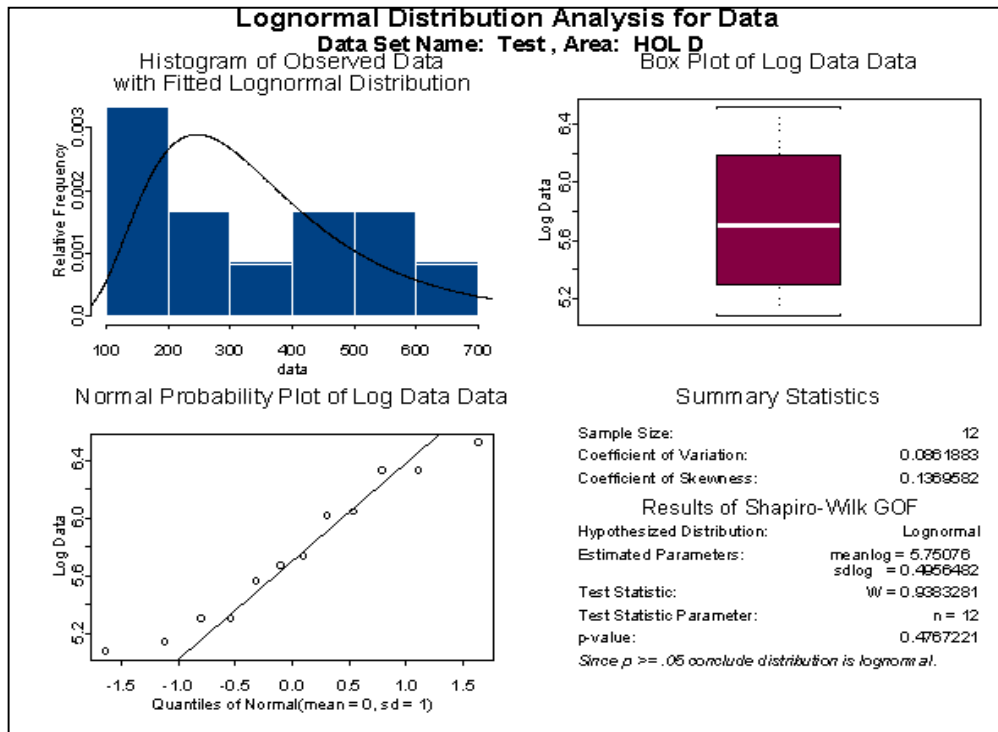
Response: log(Lead.ppm)

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	3.820197	3.820197	11.73140	0.0026814
Distance.ft	1	0.722510	0.722510	2.21875	0.1519450
Location:Distance.ft	1	0.441242	0.441242	1.35500	0.2581041
Residuals	20	6.512771	0.325639		

ATTACHMENT F
STATISTICAL DISTRIBUTION

ACME METAL COMPANY STATISTICAL DISTRIBUTION



Appendix D

Industrial Smelting Phase I Summary Report

**DRAFT
PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
INDUSTRIAL SMELTING – 19430 MT ELLIOT STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place
Suite 2-300
3058 West Grand Boulevard
Detroit, Michigan 48202

Prepared by

**WESTON SOLUTIONS OF MICHIGAN, INC.
2501 Jolly Road
Suite 100
Okemos, MI 48864
February 2004**

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct offsite sampling for the Detroit Lead Assessment Project (the project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Industrial Smelting Company (the Facility), 19430 Mt. Elliott Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 11 November and 8 December, 2003 WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. Review of the data concludes that the lead found is consistent with deposition resulting from aerial releases and suggests that such releases occurred from the site during historic smelting operations at the Facility. However, the levels found are all below the screening level (400 milligrams/kilogram) set in the Quality Assurance Sampling Plan (QASP). Due to this finding, additional work is recommended to provide additional data required to evaluate the offsite conditions. This work consists of collecting soil samples from additional properties located within 1500 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical Site operations;
- Perform a Site walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

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LIST OF APPENDICES

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Attachment B	Tables
Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

DRAFT

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the project) in Detroit, Wayne County, Michigan. This report addresses work that was conducted in the vicinity of the former Industrial Smelting (The Facility), 19430 Mt. Elliott Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- Section 1 - Introduction;
- Section 2 - Site Information;
- Section 3 - Field Activities and Procedures;
- Section 4 - Phase I Analytical Results; and
- Section 5 - Recommendations

Attachments to this Summary Report include the following:

- **Attachment A** Figures
- **Attachment B** Tables
- **Attachment C** Wind Rose Plot
- **Attachment D** Photographs of Sampling Locations
- **Attachment E** Concentration Graph
- **Attachment F** Statistical Distribution

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 19430 Mt Elliot Street in Detroit, Wayne County, Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of offsite properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility appears to be a building that is enclosed by a fence extending around the back. The property is owned by Kath Chemicals and is apparently in active operation. There is a parking lot in front of the building. The areas five blocks north, south, and east of the Facility are industrial with residences starting at the eastern extent. The area to the west of the Facility is industrial for about a half a block and then residential for about four and a half blocks.

2.1.2 Site History

Review of the Bresser's directory indicated that Industrial Smelting owned the property from 1951 to 1981. Co-owners of this property included Jessop Steel Sales Company, Metal BI PROD Company, Marx S. H, Marx Jack Mtl, and Wolf Sidney J Mtl in 1951. Green Rve Stl Corporation and Jessop Steel Co were co-owners in 1960-61. Kath Khmels & Mntnc were the current owners listed.

Review of the Sanborn maps for this address show that from 1967 through 2002 Steel Warehouse and Smelting rooms are present.

The aerial photograph review indicated the immediate area surrounding this address was industrialized from 1957 to the present. However, heavy residential settings occur one block west of the facility and two blocks east. Structures identified from the most recent aerial photograph (2003 GlobeXplorer™) include a building in the center of the property with undeveloped space to the east and west. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the Fire Records, three building permits were located for the additions to a smelting plant.

Review of the BEA for nearby “17403 Mt. Elliott Street”, dated August 2002, prepared by Superior Environmental for Hantz Group Inc, indicates that lead was detected on the site but the levels were not specified.

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter-related releases were present offsite and could be attributed to the former facility. The general sampling protocol presented in Section 2 of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1000-foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for the Facility.

Prior to sample collection, upwind and downwind sampling areas were established, within 2500 and 1800 feet from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit metropolitan area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or State owned properties located within these established areas.

The City and/or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual city or state owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, photo documentation) were conducted as described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project*. WESTON collected samples from 11 city and/or State owned parcels and 1 greenway near the Facility. Five City and/or State owned parcels and one greenway parcel were sampled in the downwind direction and six City and/or State owned parcels were sampled in the

upwind direction. Two composite samples were collected from each of the 6 downwind parcels and six of the upwind parcels. A total of 24 composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky, Ms. Amanda Freeman, Ms. Shamille Lewis, and Mr. Eric Martinson conducted field sampling on 11 November, 2003. Ms. Amanda Freeman and Ms. Shamille Lewis completed field sampling on 8 December, 2003. Since 12 City and/or State owned parcels were not available, WESTON selected one greenway, prior to the sampling event, and submitted the location of the greenway to the City of Detroit to obtain their approval and access. Because the greenway was not located on the same street as the mailing address of the nearest building, the number of the building was used in conjunction with the street of the greenway. For example, a parcel at 3900 E Outer Drive with an adjacent greenway located across the street from a building with a visible address of 19451 Sherwood Street, would be identified SHE – 19451. These changes were noted in the logbook and can be viewed in the “Summary Table For Sample Properties” (located in **Attachment E**) and on the sample sketches (located in **Attachment A**).

WESTON collected two samples from each of the six upwind City and/or State owned parcels for a total of 12 samples. Also, two samples were taken from each of the five downwind City and/or State owned parcels and of the one greenway for a total of 12 downwind samples. Twenty four soil samples were submitted for analysis. Five samples were designated as matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Industrial Smelting facility project area:

- 12 composite soil samples in the upwind direction
- 12 composite soil samples in the downwind direction

Sample locations from both the upwind and downwind areas are listed in Table 1 included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. Samples collected from properties upwind of the former facility did not contain concentrations of lead above the project screening level (400milligram/kilogram [mg/kg]) established in the Phase I QASP. No samples collected from properties downwind of the Facility contained concentrations of lead above the project screening level (400mg/kg). A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	0	26-230
Downwind	12	0	56-390
TOTAL	24	0	26-390

4.2 Atmospheric Conditions

During Phase I soil sampling activities, upwind and downwind parcels were chosen based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan area. A copy of the wind

rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the city of Detroit Metropolitan area. If smelting operations occurred, lead in soil resulting from aerial deposition would be detected downwind in the northeast direction from the Facility. Parcels ranging from 1125 feet to 2475 feet were chosen southwest in the upwind direction of the Facility. Parcels ranging from 975 feet to 1800 feet were chosen northeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. Low-level lead concentrations were found in both the downwind and upwind direction from the Facility. A detailed analysis of upwind and downwind concentrations is contained in section **4.4 Spatial Analysis**.

4.3 Spatial Analysis

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus the Phase I investigation was designed to determine if an off-site airborne release has occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead, just below the screening level, occurs within the primary downwind envelope.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated low levels of lead were present in the upwind direction from the Facility. The downwind direction also showed low concentrations (all less than the screening level) of lead in the downwind direction but presented a decreasing concentration with increasing distance from the Facility. These conclusions were confirmed by a linear regression of the concentrations versus distance data (**Attachment E**).

4.4 Statistical Analysis

Analytical data was entered into a spreadsheet file and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind mean is 192 mg/kg and the upwind mean is 110mg/kg indicating the downwind concentrations are greater than the upwind concentrations. In addition the relative frequency histogram (**Attachment F**) for the downwind data is an uneven distribution across a wide range of concentrations while the upwind results exhibit a more even distribution over a smaller range of concentrations. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data potentially represent separate conditions.

4.5 Conclusions

The pattern of analytical results for lead in soil samples collected for the Facility suggests that lead contamination detected in downwind locations may be attributable to historic releases from historic smelting operations at the Facility. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and Environmental Protection Act 1994, as amended.

None of the samples collected from upwind of the Facility contained concentrations of lead above the 400 mg/kg screening level. The downwind samples show a clear trend of decreasing concentration with increasing distance. The levels of lead start at 390 mg/kg (975 feet from the facility) and decrease out to a distance of 1,800 feet from the Facility. The data collected during the Phase I sampling supports that an identifiable aerial release occurred from the Facility during historic smelting operations. However, the levels identified during the Phase I investigation are less than the screening level.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

Based on the evaluation of the Phase I analytical data, it is recommended that additional tasks be completed to further define the potential risk. The determination that additional work is necessary is based on two factors:

- The presence of residential receptors located within approximately 1,000 feet downwind of the former facility,
- The pattern of lead concentrations within the study area suggests a strong potential that soils at downwind properties have been impacted by aerial deposition from releases of lead from historic smelting operations at the former Industrial Smelting facility.

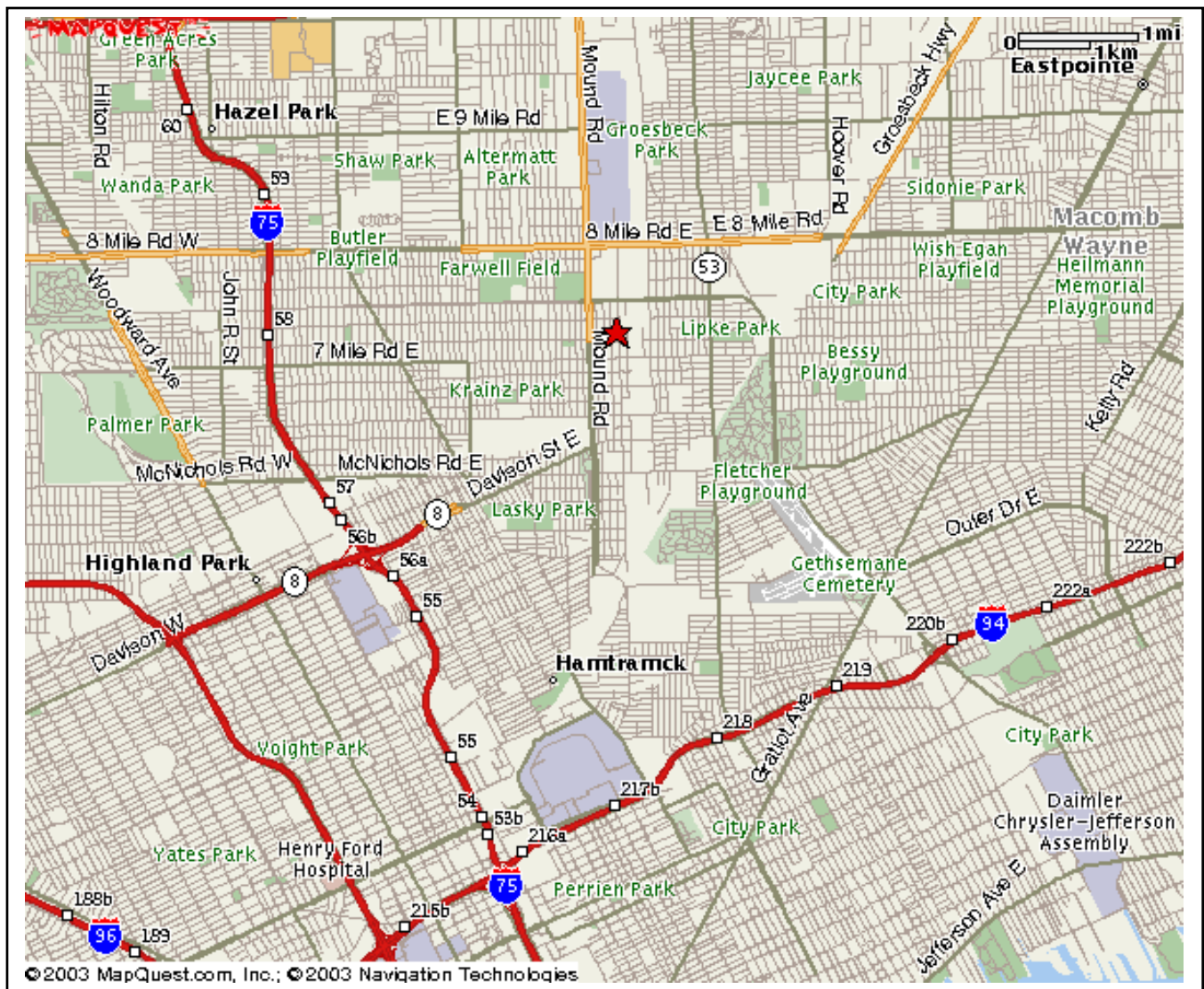
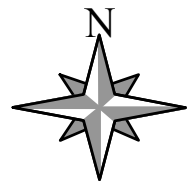
To be certain that the conclusions are based on enough data it is recommended that additional soil samples be collected from additional properties located within 1,500 feet downwind of the Facility.

If the results of that effort support the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical Facility operations;
- Perform a Facility walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

ATTACHMENT A
FIGURES

FIGURE 1
Site Location Map
19430 Mt Elliot Street

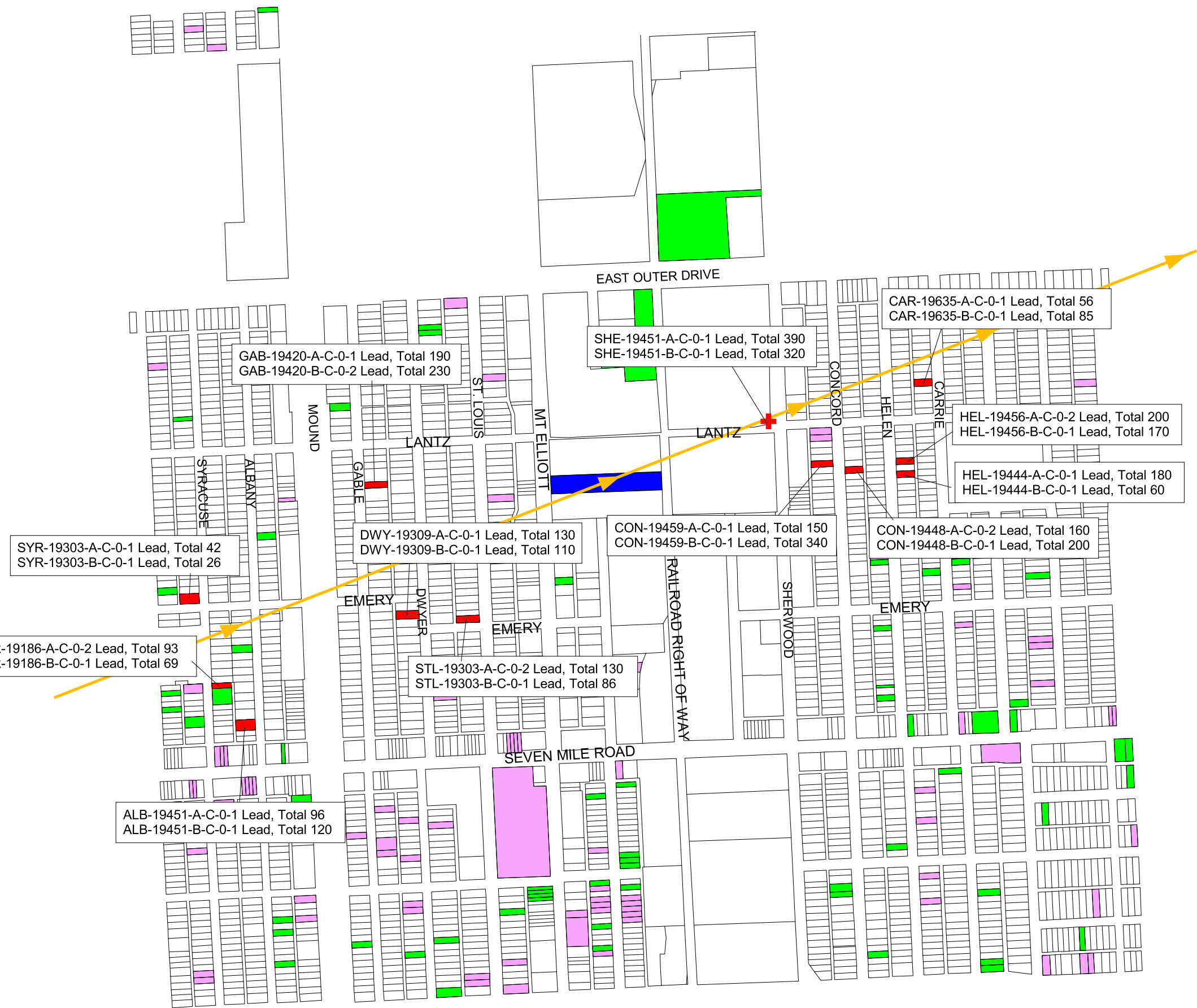


WESTON SOLUTIONS, INC. OF MICHIGAN



300 River Place, Suite 2800
Detroit, Michigan 48207

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001



LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

- Sampled Properties (Greenway)
- Parcel Boundaries
- Sampled Properties
- Facility of Concern
- State Owned Property
- City Owned Property
- Wind Direction

Note: All Lead, Total analytical results are shown in mg/kg.

PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Industrial Smelting
19430 Mt. Elliot

WORK ORDER No.: 20083.028.001	PROJECT MANAGER:	
DRAWN BY: JLT	CHECKED BY:	
DRAWING NAME:	DIRECTORY/ FOLDER: JLT//D:\DLAP\apn09_09_03.apr	
CONTRACT No.:	DELIVERY ORDER No.:	
SCALE:	REPORT DATE:	
DATE: January 2004	REVISION No.:	FIGURE No. 2

CLIENT/SUBJECT Mt Elliot W.O. NO. _____

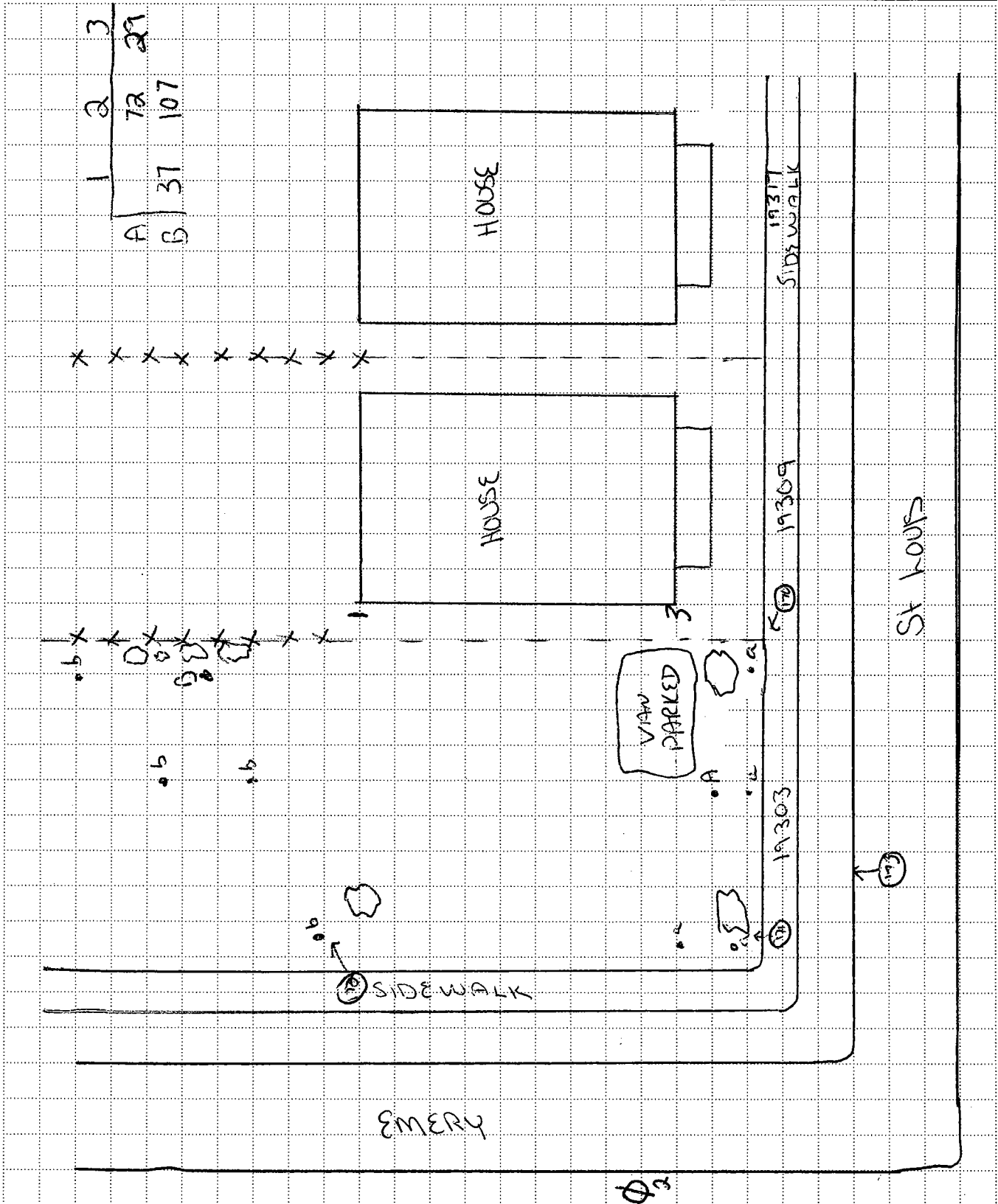
TASK DESCRIPTION STH-19303 AMB TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>	
DEPT _____	DATE _____



CLIENT/SUBJECT mt Elliot W.O. NO. _____

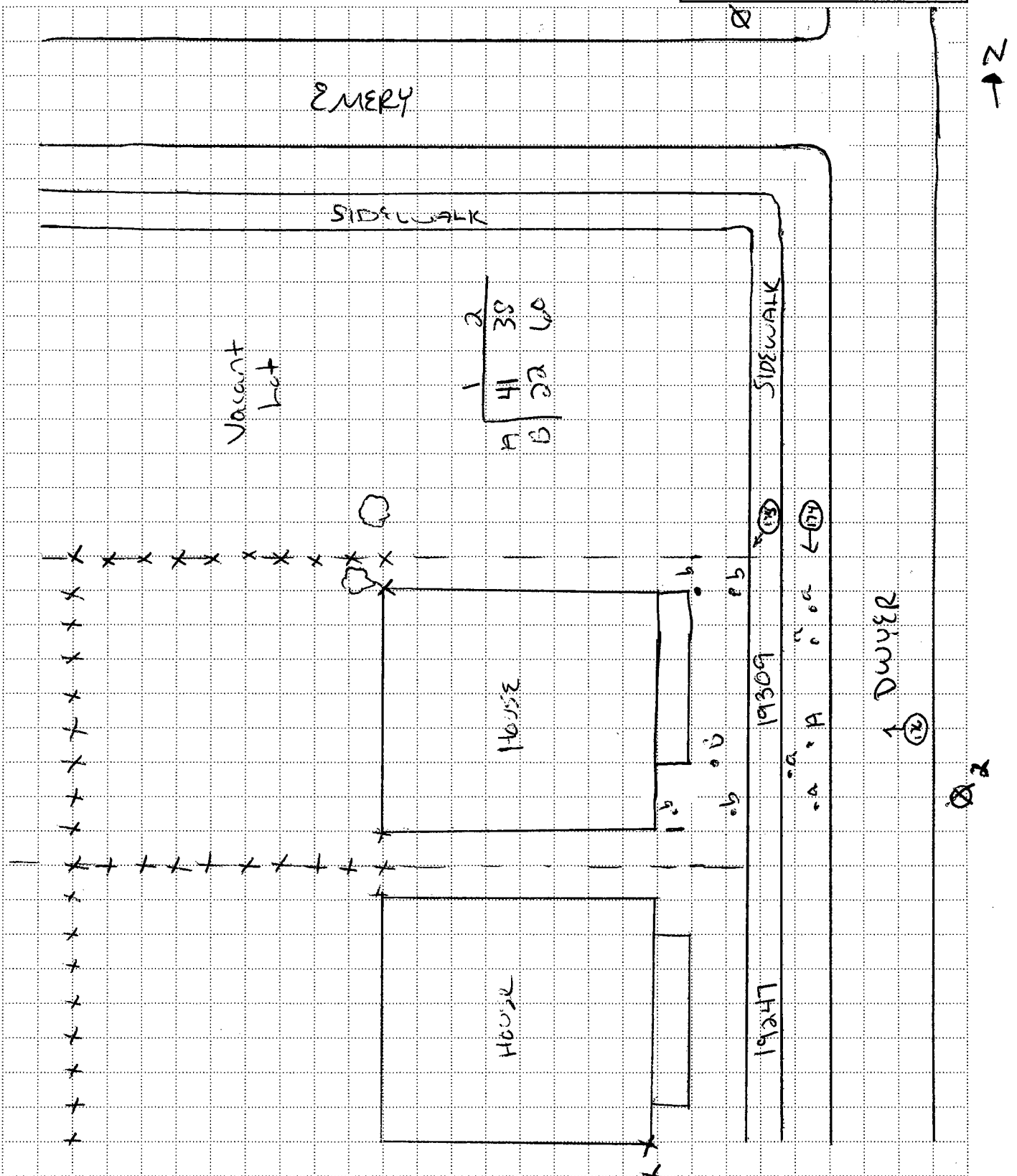
TASK DESCRIPTION Dwy-19309 A+B TASK NO. _____

PREPARED BY IT. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT Mt Elliot W.O. NO. _____

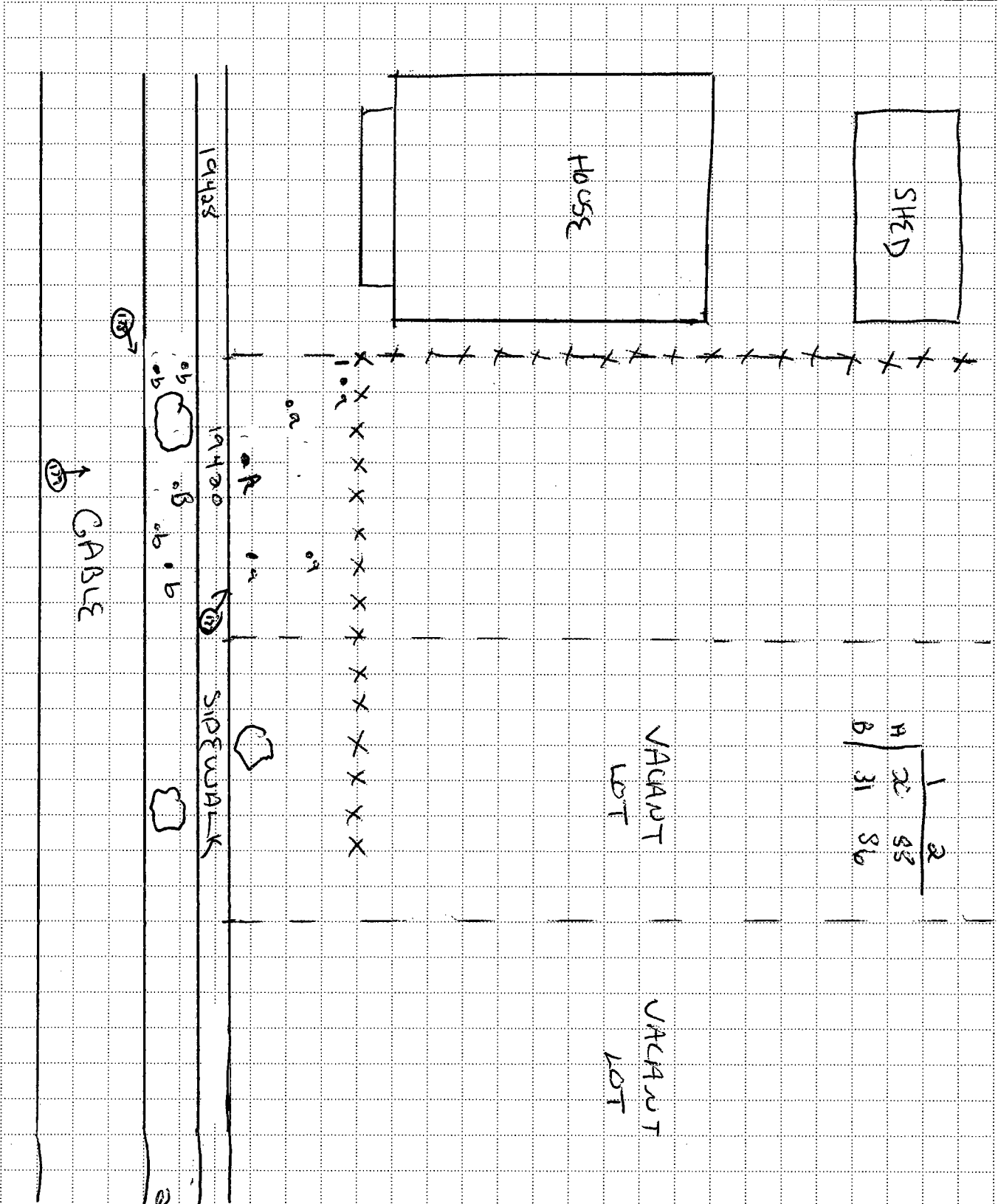
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PREPARED BY A. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT Mt Elliot W.O. NO. _____

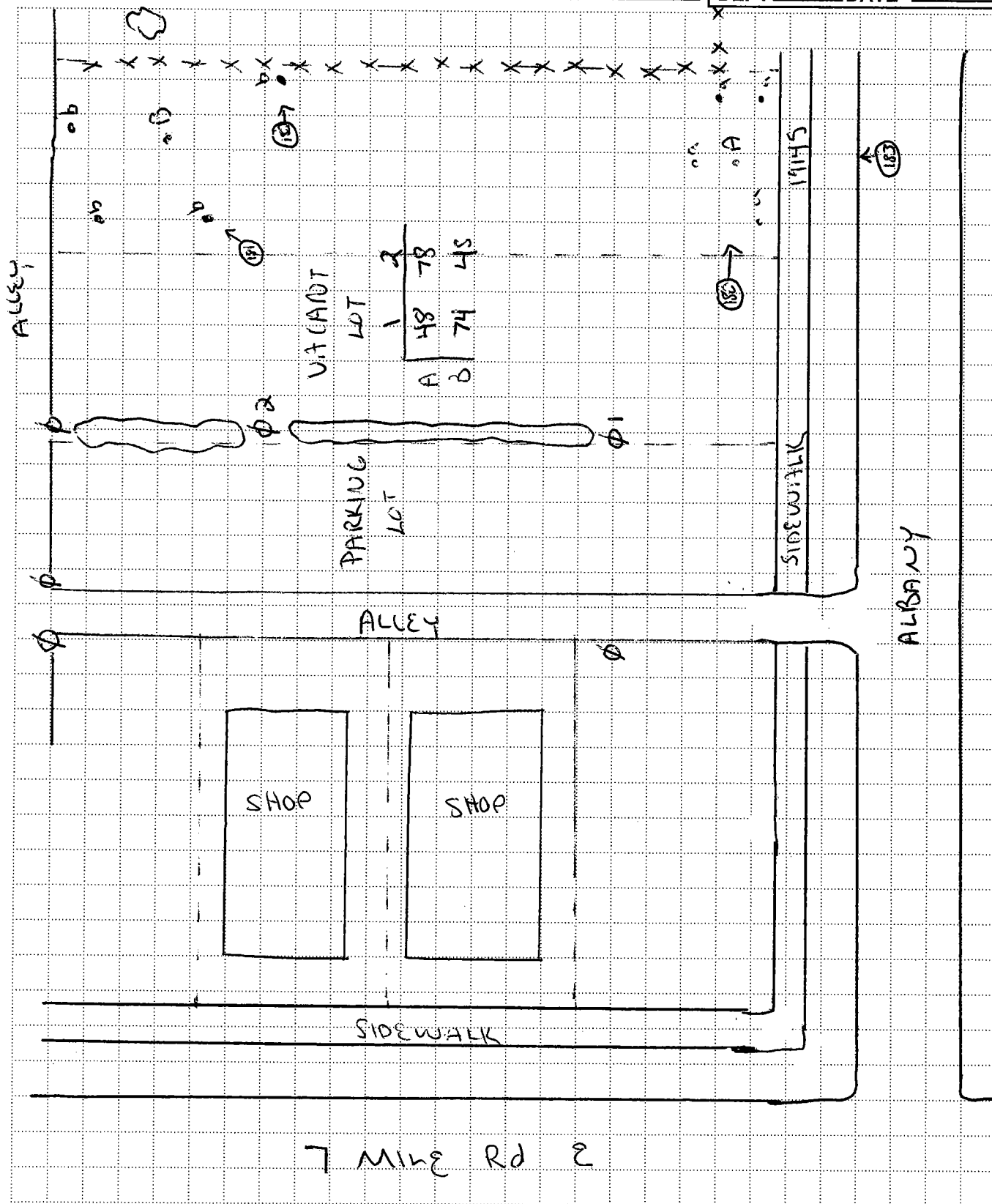
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PREPARED BY A. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT MT Elliot W.O. NO. _____

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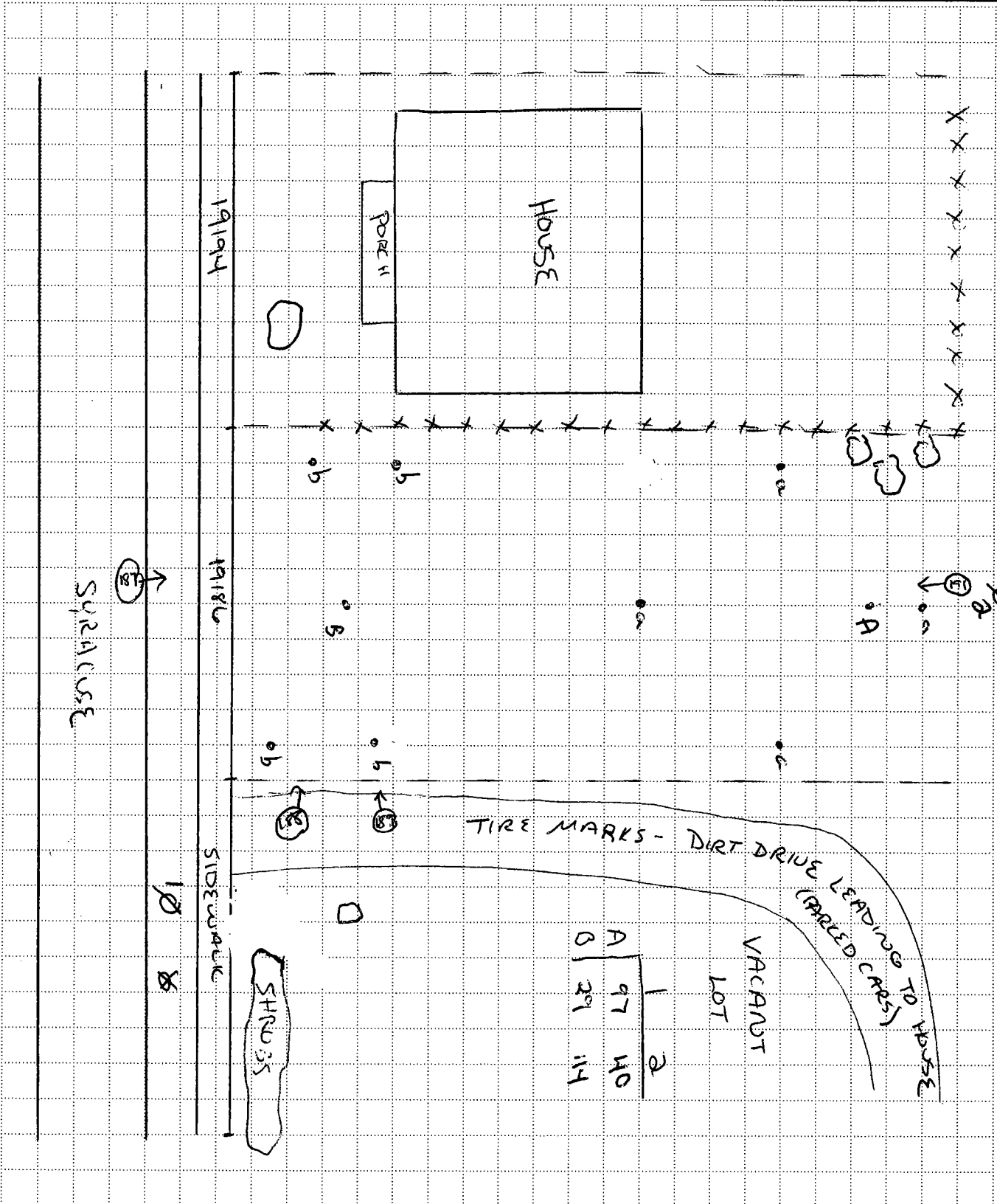
PREPARED BY A. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	

DEPT _____	DATE _____



CLIENT/SUBJECT Mt Elliot W.O. NO. _____

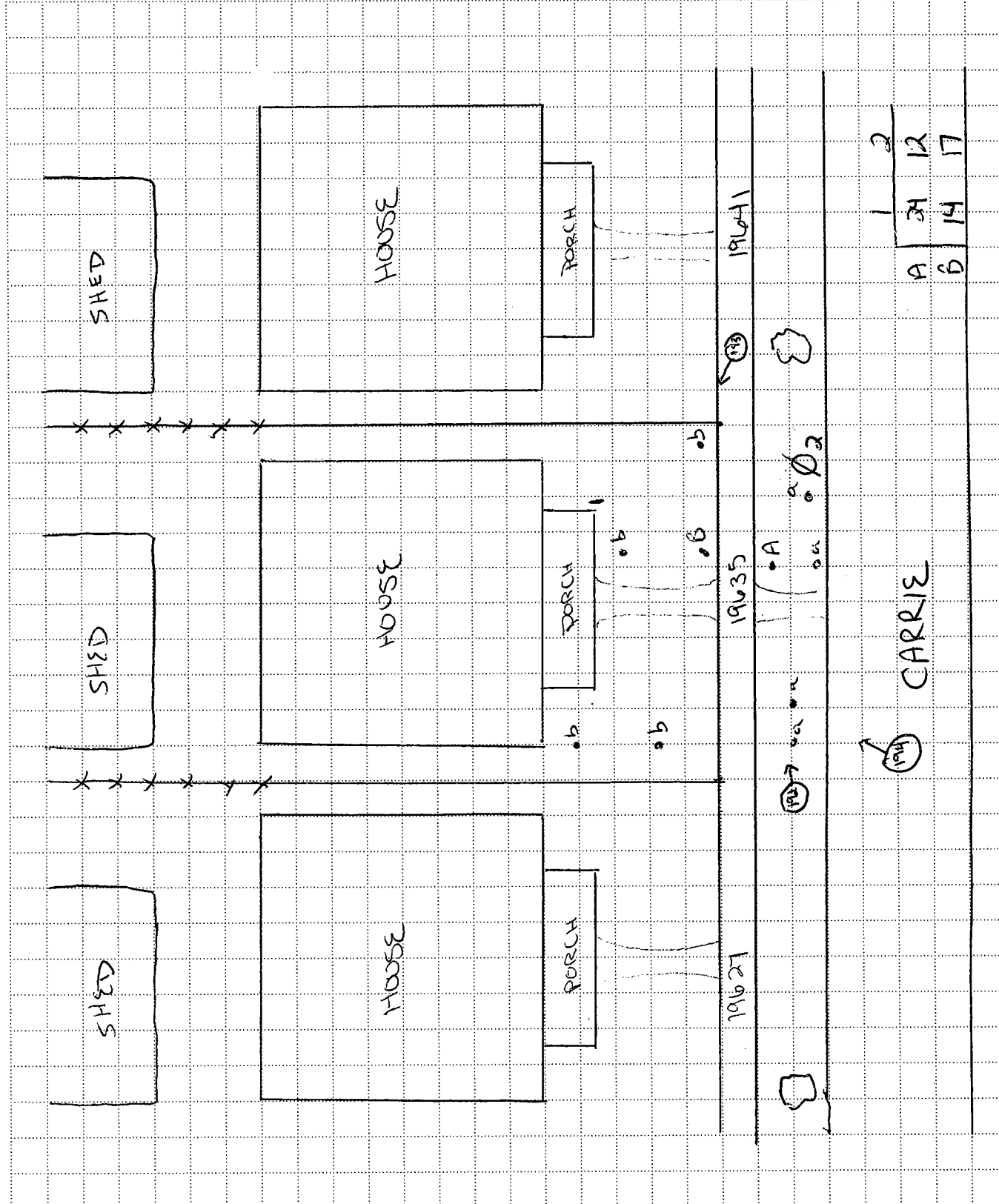
TASK DESCRIPTION CAR-19635 A+B TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



* Driveways to left side of house
- not pictured

CLIENT/SUBJECT MT ELLIOT

W.O. NO. _____

TASK DESCRIPTION HEL-19456 A-B

TASK NO. _____

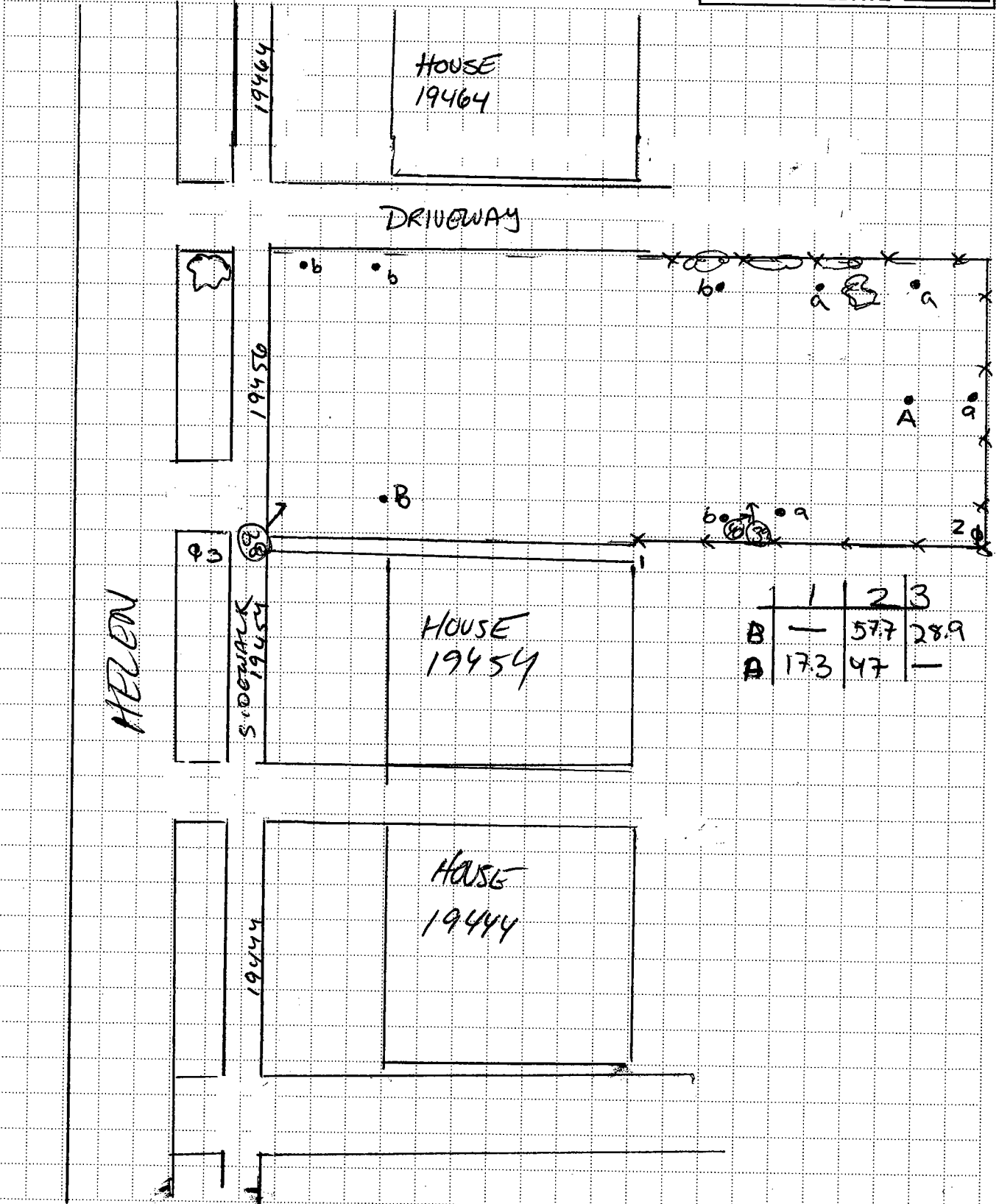
PREPARED BY R. Nemirovsky DEPT _____ DATE 4/11/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____

↑N



CLIENT/SUBJECT Mt Elliot W.O. NO. _____

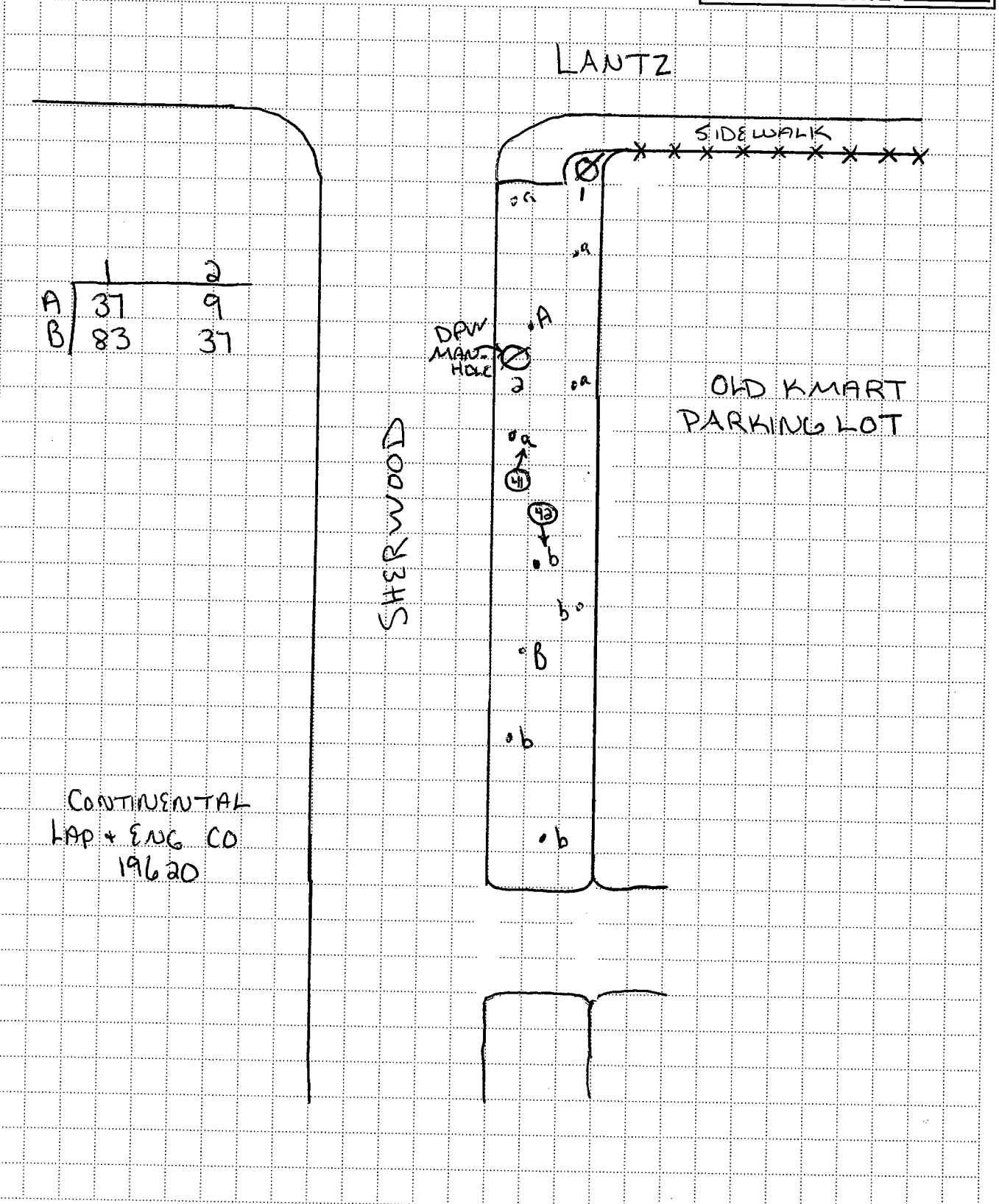
TASK DESCRIPTION SHE-19451 A+B (Sherwood) TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-11-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT Mt Elliot W.O. NO. _____

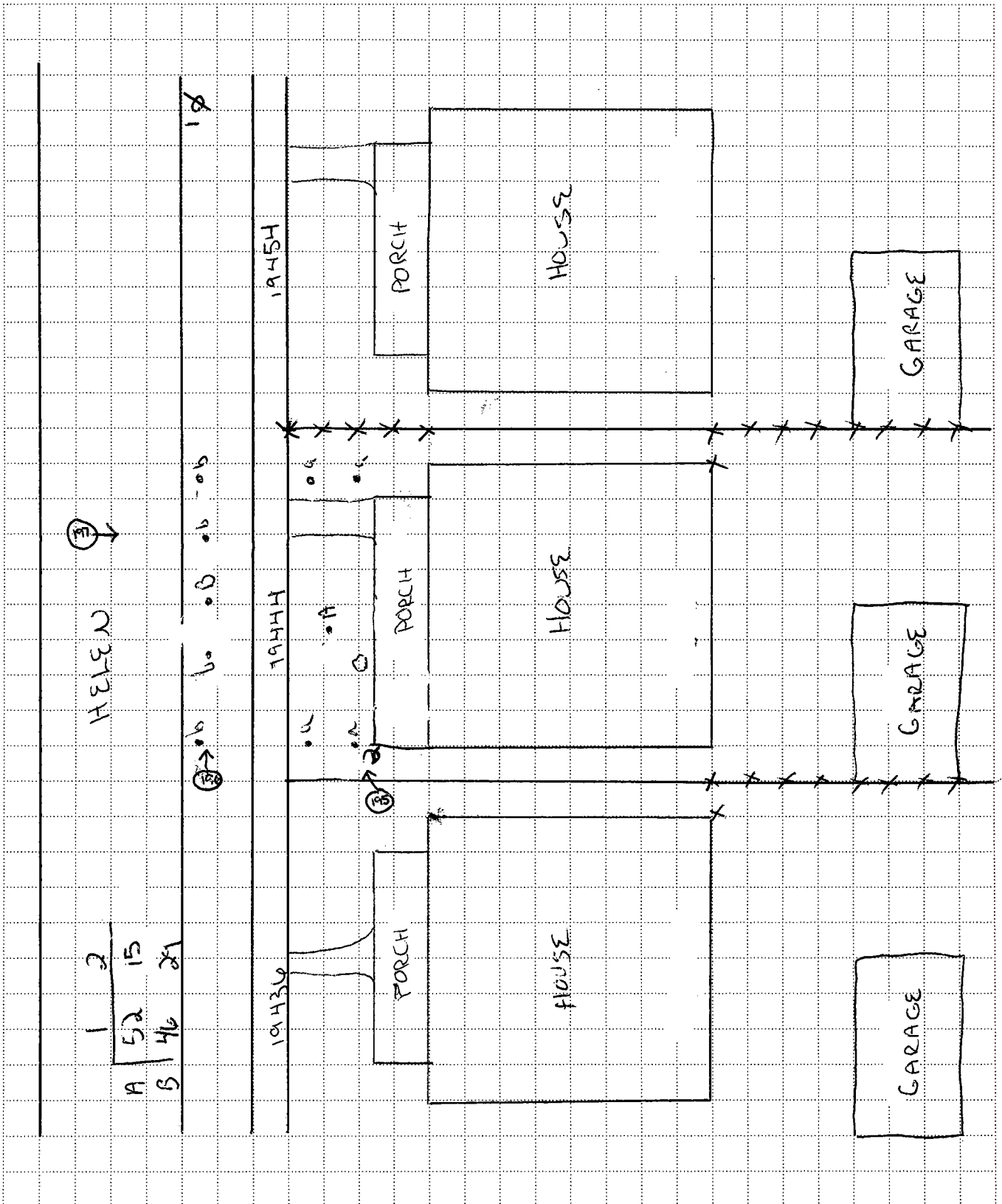
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PREPARED BY A. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT MT Elliot

W.O. NO. _____

TASK DESCRIPTION CON 19459 A+B and CON 19448 A+B

TASK NO. _____

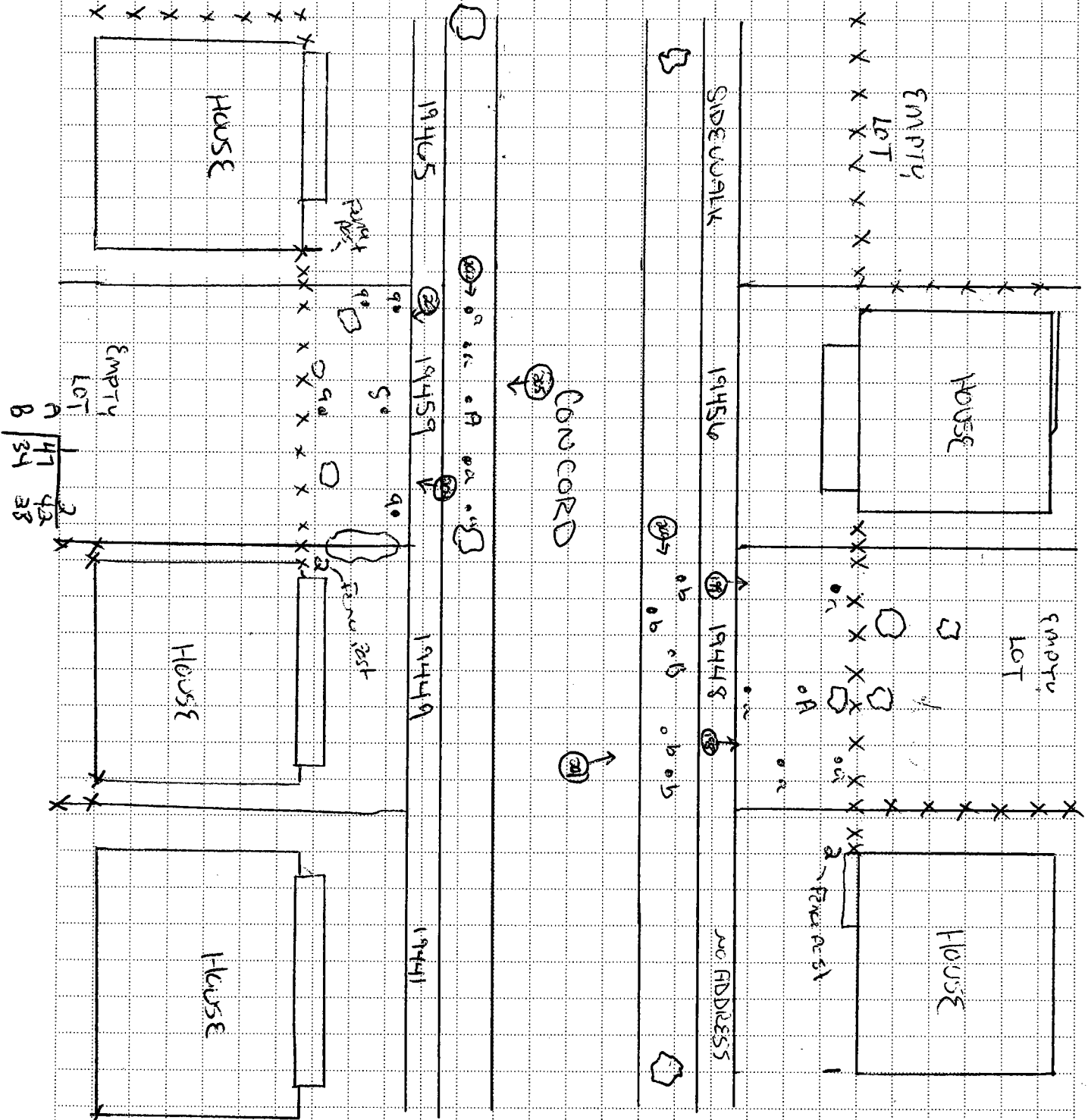
PREPARED BY A. Freeman DEPT _____ DATE 12/8/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____



ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
19303 St Louis	Vacant property located at the corner of Emery and St Louis St and on the south of a house at 19309 St Louis.	STL-19303-A-C-0-2
		STL-19303-B-C-0-1
19309 Dwyer	House located on the west side of Dwyer St. The front of the property and Greenway were used.	DWY-19309-A-C-0-1
		DWY-19309-B-C-0-1
19420 Gable	Vacant property located on the east side of Gable St and to the south of a house at 19428 Gable. The front of the property and Greenway were used because the lot was fenced.	GAB-19420-A-C-0-1
		GAB-19420-B-C-0-2
19145 Albany	Vacant property on the west side of Albany St and directly south of a fenced in lot.	ALB-19145-A-C-0-1
		ALB-19145-B-C-0-1
19303 Syracuse	Vacant property located at the corner of Emery and Syracuse St and on the south side of a vacant property.	SYR-19303-A-C-0-1
		SYR-19303-B-C-0-1
19186 Syracuse	Vacant property located on the east side of Syracuse St and on the south side of a house at 19194 Syracuse.	SYR-19186-A-C-0-2
		SYR-19186-B-C-0-1
Downwind Properties		
Address	Description	Sample Identification
19635 Carrie	House located on the west side of Carrie St. The front of the property and Greenway were used.	CAR-19635-A-C-0-1
		CAR-19635-B-C-0-1
19456 Helen	Vacant property located on the east side of Helen St.	HEL-19456-A-C-0-2
		HEL-19456-B-C-0-1
3900 E Outer Dr *	Greenway located at the corner of Sherwood and Lantz St, on the east side of parking lot of the old Kmart, and to the north of Industrial building at 19451 Sherwood.	SHE-19451-A-C-0-1
		SHE-19451-B-C-0-1
19444 Helen	House located on the east side of Helen St. The front of the property and Greenway were used.	HEL-19444-A-C-0-1
		HEL-19444-B-C-0-1
19448 Concord	Vacant property located on the east side of Concord St. Front of property and Greenway were used due to fence. On the south side of house at 19456 Concord.	CON-19448-A-C-0-2
		CON-19448-B-C-0-1
19459 Concord	Vacant property located on the west side of Concord St. Front of property and Greenway were used due to fence. On the south side of house at 19465 Concord.	CON-19459-A-C-0-1
		CON-19459-B-C-0-1

*Notes:

2) Nearest address used in the sample ID

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
19303 St Louis	STL-19303-A-C-0-2	130
19303 St Louis	STL-19303-B-C-0-1	86
19309 Dwyer	DWY-19309-A-C-0-1	130
19309 Dwyer	DWY-19309-B-C-0-1	110
19420 Gable	GAB-19420-A-C-0-1	190
19420 Gable	GAB-19420-B-C-0-2	230
19145 Albany	ALB-19451-A-C-0-1	96
19145 Albany	ALB-19451-B-C-0-1	120
19303 Syracuse	SYR-19303-A-C-0-1	42
19303 Syracuse	SYR-19303-B-C-0-1	26
19186 Syracuse	SYR-19186-A-C-0-2	93
19186 Syracuse	SYR-19186-B-C-0-1	69
Downwind		
19635 Carrie	CAR-19635-A-C-0-1	56
19635 Carrie	CAR-19635-B-C-0-1	85
19456 Helen	HEL-19456-A-C-0-2	200
19456 Helen	HEL-19456-B-C-0-1	170
3900 E Outer Dr	SHE-19451-A-C-0-1	390
3900 E Outer Dr	SHE-19451-B-C-0-1	320
19444 Helen	HEL-19444-A-C-0-1	180
19444 Helen	HEL-19444-B-C-0-1	60
19448 Concord	CON-19448-A-C-0-2	160
19448 Concord	CON-19448-B-C-0-1	200
19459 Concord	CON-19459-A-C-0-1	150
19459 Concord	CON-19459-B-C-0-1	340

***Notes**

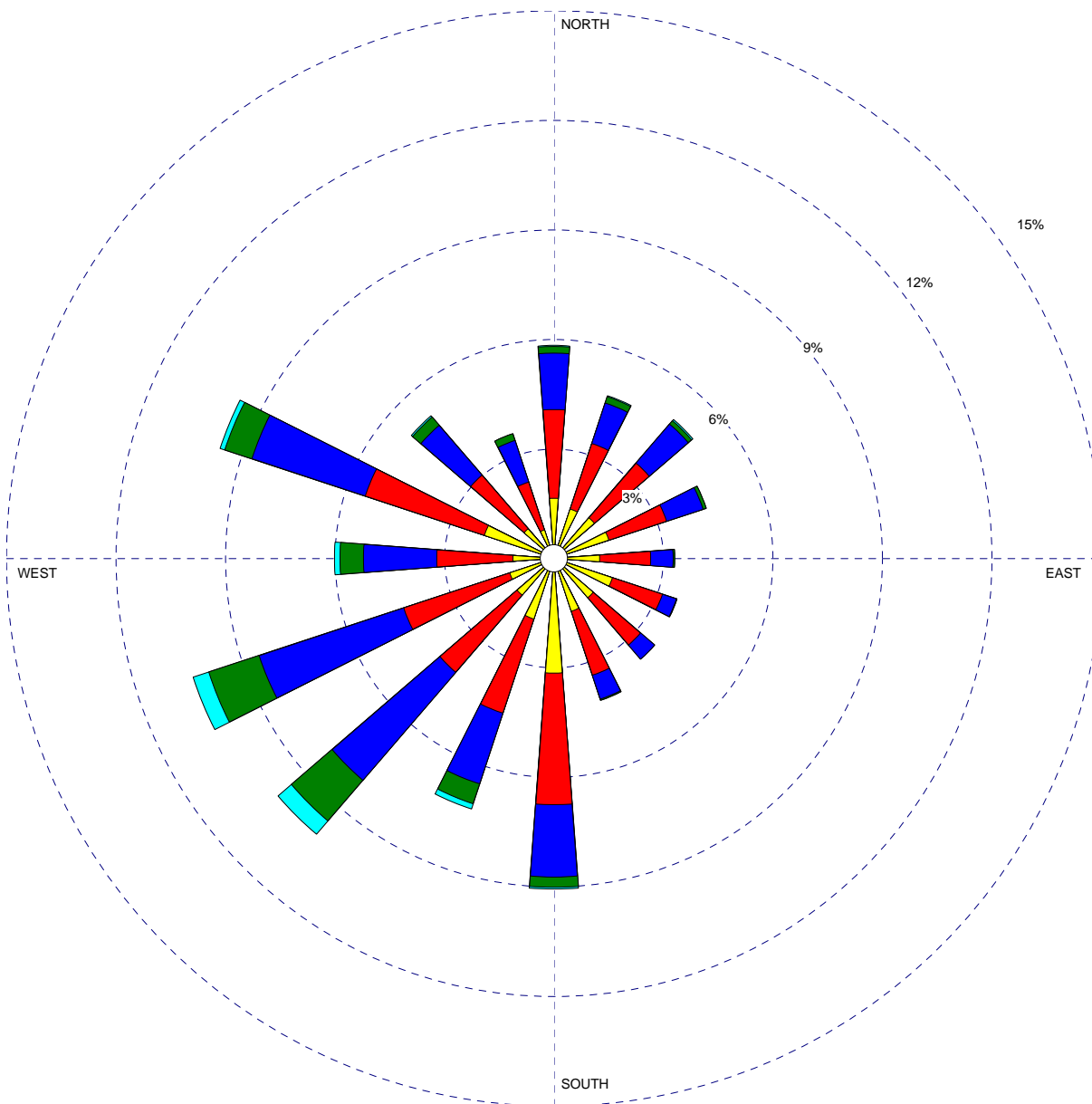
1) Bold indicates results equal to or greater than to 400 mg/kg.

ATTACHMENT C

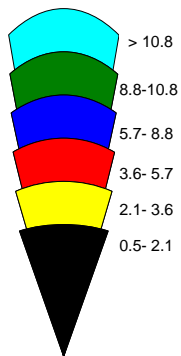
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

Former Industrial Smelting – 19430 Mt Elliot

19303 St Louis – Vacant property located at the corner of Emery and St Louis St and on the south side of the house at 19309 St Louis.

Looking west along the vacant property at the total sampling area.



Looking southwest and west, respectively, at 5 total discrete sample A locations.



Looking northwest at 5 total discrete sample B locations.



Mt Elliot (cont'd)

19309 Dwyer – House located on the west side of Dwyer St. The front of the property and Greenway were used for sampling.

Looking south along greenway at 5 discrete sample A locations.



Looking southwest along property at 5 discrete sample B locations.



Looking west along the property at the total sampling area.



Mt Elliot (cont'd)

19420 Gable – Vacant property located on the east side of Gable St and to the south of a house at 19428 Gable. The front of the property and greenway were used because the lot was fenced.

Looking northeast along property at 5 discrete sample A locations.



Looking south along greenway at 5 discrete sample B locations.



Looking east along the property at the total sampling area.



Mt Elliot (cont'd)

19145 Albany – Vacant property on the west side of Albany St and directly south of a fenced in lot.

Looking north along the vacant property at 5 discrete sample A locations.



Looking northwest and north, respectively, at 5 total discrete sample B locations.



Looking west along the property at the total sampling area.



Mt Elliot (cont'd)

19303 Syracuse – Vacant property located at the corner of Emery and Syracuse St and on the south side of a vacant property.

Looking north along the vacant property at 5 discrete sample A locations.



Looking northwest along the vacant property at 5 discrete sample B locations.



Looking west along the vacant property at the total sampling area.



Mt Elliot (cont'd)

19186 Syracuse – Vacant property located on the east side of Syracuse St and on the south side of a house at 19194 Syracuse.

Looking west along the vacant property at 5 discrete sample A locations.



Looking north along the vacant property at 5 total sample B locations.



Looking east along the vacant property at the total sampling area.



Mt Elliot (cont'd)

19635 Carrie – House located on the west side of Carrie St. The front of the property and greenway were used.

Looking north along greenway at 5 discrete sample A locations.



Looking southwest along the property at 5 discrete sample B locations.



Looking northwest along the property at the total sampling area.



Mt Elliot (cont'd)

19456 Helen – Vacant property located on the east side of Helen St and between houses at 19454 and 19464 Helen.

Looking northeast along the vacant property at 5 discrete sample A locations.



Looking northeast along the vacant property at 3 of 5 discrete sample B locations.



Looking north along the vacant property at 2 of 5 discrete sample B locations.



Mt Elliot (cont'd)

3900 E Outer Dr – Greenway located at the corner of Sherwood and Lantz St, on the east side of the parking lot of the old Kmart, and directly north of Industrial building at 19451 Sherwood.

Looking south along greenway at 5 discrete sample A locations.



Looking north along greenway at 5 discrete sample B locations.



Mt Elliot (cont'd)

19444 Helen – House located on the east side of Helen St. The front of the property and greenway were used.

Looking northwest along property at 5 discrete sample A locations.



Looking north along greenway at 5 discrete sample B locations.



Looking east along property at the total sampling area.



Mt Elliot (cont'd)

19448 Concord – Vacant property located on the west side of Concord St and directly south of a house at 19456 Concord. Front of property and greenway used due to fence.

Looking east along property at 5 total discrete sample A locations.



Looking south along greenway at 5 discrete sample B locations.



Looking east along the property at total sampling area.



Mt Elliot (cont'd)

19459 Concord – Vacant property located on the west side of Concord St and directly south of a house at 19465 Concord. The front of the property and greenway were used due to a fence.

Looking south along greenway at 5 discrete sample A locations.



Looking west along the property at 5 total discrete sampling B locations.

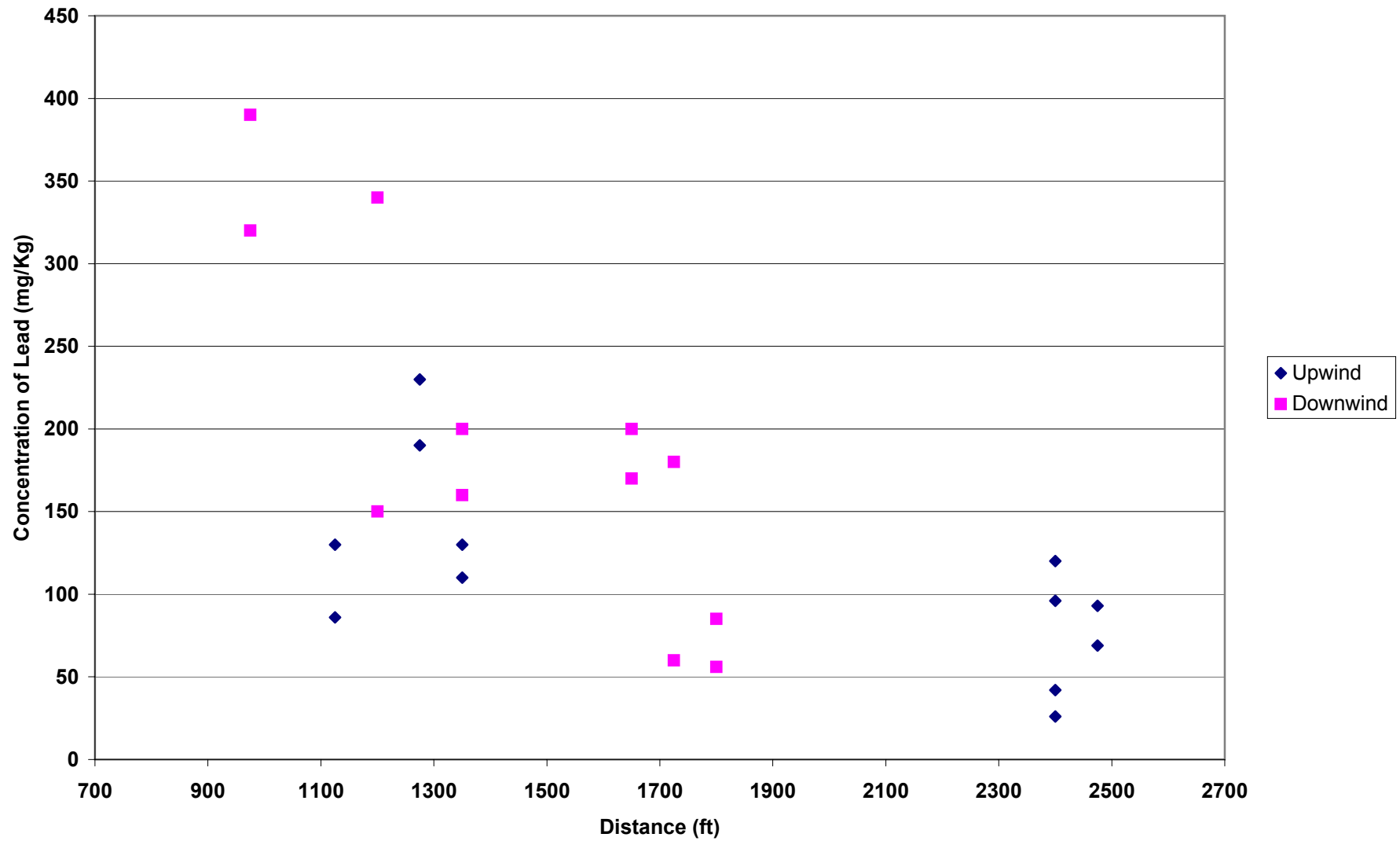


Looking west along property at the total sampling area.



ATTACHMENT E
CONCENTRATION GRAPH

19430 Mt Elliot



Industrial

*** Linear Model ***

Call: lm(formula = Lead.ppm ~ Location + Distance.ft + Distance.ft:Location, data = Industrial, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-114	-35.76	-7.939	43.67	87.15

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	216.9237	52.7731	4.1105	0.0005
Location	389.9067	95.9307	4.0645	0.0006
Distance.ft	-0.0581	0.0273	-2.1253	0.0462
Distance.ft:Location	-0.2276	0.0606	-3.7541	0.0012

Residual standard error: 56.04 on 20 degrees of freedom

Multiple R-Squared: 0.6941

F-statistic: 15.12 on 3 and 20 degrees of freedom, the p-value is 0.00002259

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	40755.04	40755.04	12.97839	0.001777766
Distance.ft	1	57462.31	57462.31	18.29880	0.000367515
Distance.ft:Location	1	44255.82	44255.82	14.09321	0.001249388
Residuals	20	62804.45	3140.22		

*** Linear Model ***

Call: lm(formula = Log.Lead ~ Location + Distance.ft + Distance.ft:Location, data = Industrial, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-0.9603	-0.2549	0.02991	0.3528	0.569

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	5.6648	0.4286	13.2163	0.0000
Location	1.7506	0.7791	2.2468	0.0361
Distance.ft	-0.0006	0.0002	-2.7143	0.0134
Distance.ft:Location	-0.0010	0.0005	-2.0264	0.0563

Residual standard error: 0.4551 on 20 degrees of freedom

Multiple R-Squared: 0.5918

F-statistic: 9.664 on 3 and 20 degrees of freedom, the p-value is 0.0003771

Analysis of Variance Table

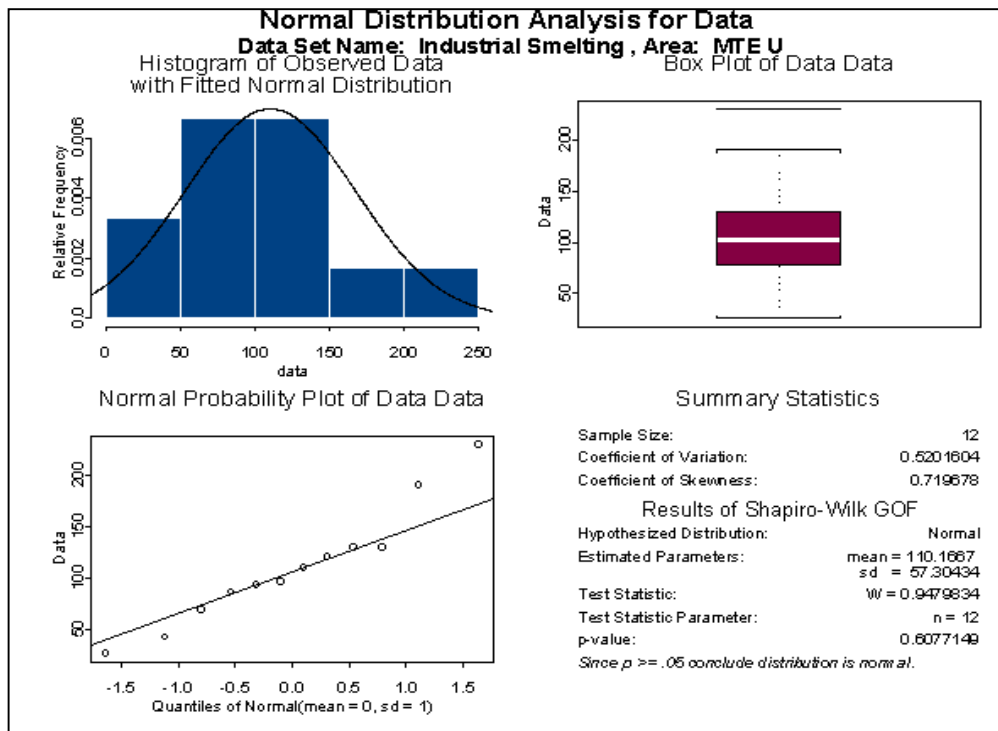
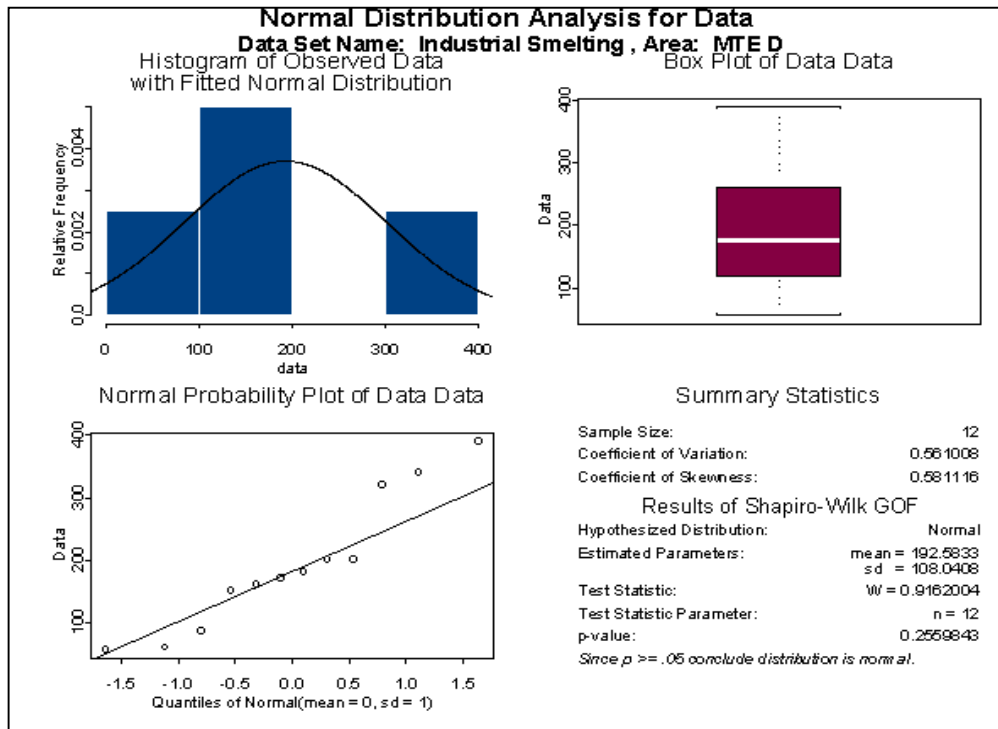
Response: Log.Lead

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	1.732174	1.732174	8.36189	0.00901969
Distance.ft	1	3.422642	3.422642	16.52244	0.00060463
Distance.ft:Location	1	0.850641	0.850641	4.10638	0.05626619
Residuals	20	4.143022	0.207151		

ATTACHMENT F
STATISTICAL DISTRIBUTION

INDUSTRIAL SMELTING STATISTICAL DISTRIBUTION



Appendix E

Continental Metal Company Phase I Summary Report

DRAFT

**PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
CONTINENTAL METAL COMPANY – 11500 RUSSELL STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place

Suite 2-300

3058 West Grand Boulevard

Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.

2501 Jolly Road

Suite 100

Okemos, Michigan 48864

February 2004

W.O. No: 20083.028.001

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Continental Metal Company (the Facility), 11500 Russell Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 11 November 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. Review of the data concluded that the lead found was consistent with deposition resulting from aerial releases and suggested that such releases occurred during historic smelting operations at the Facility. To address these concerns, it is recommended that the following additional tasks be completed:

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Facility operations;
 - Perform a Facility walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

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3 FIELD ACTIVITIES AND PROCEDURES.....	3-1
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LIST OF ATTACHMENTS

Title

Attachment A	Figures
Attachment B	Tables
Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling activities for the Detroit Lead Assessment Project in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Continental Metals Company (the Facility), 11500 Russell Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Summary Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E** – Concentration Graph, and

- **Attachment F** – Statistical Distribution.

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 11500 Russell Street in Detroit, Wayne County, Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the Facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility appears to be owned by Continental Metal because it is painted above the address on the building. There is a barbed wire fence around the Facility perimeter. The gray building is located next to Dana Container, Inc. on the south side. It cannot be seen if the building is still in use. The areas five blocks north, south, and west of the Facility are industrial. The area to the east of the Facility is industrial for a block and residential for at least four blocks.

2.1.2 Site History

A review of Bresser's city directory indicated that Continental Metals Company owned the property from 1946 to 1971. Co-owners of this property included: Temchin Danl Metls in 1946, Ginsberg Meyer STL, Amer Steel Sales, Temchin Danl Metals in 1951, Daniel Temchin in 1961, and David Matz Metl Co in 1971, 1981, 1991, and 1996. Continental Metal Co is the primary owner of the property in 2003.

A review of the Sanborn maps for this address show the following chronology: 1951 metal junk yard present with metal warehouse, smelting room, scrap stage, and steel warehouse present; 1968-2002 metal junk yard present with metal warehouse, smelting room, scrap stage, and steel warehouse still present.

The aerial photograph review indicated this area was industrialized from 1957 to the present with residential areas within 1,000 feet (ft.) to the east and three blocks to the south. Structures identified from the most recent aerial photograph (2003 GlobeXplorer™) include a building in the southern portion of the property with undeveloped space to the north. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the Fire Records, a license for scrap iron and metal processing was located.

Review of the BEA for “Several Parcels near Russell and Holbrook Street”, dated August 1995, prepared by Vision Environmental Inc. for American Axle and Manufacturing Inc, indicates that lead was detected on the Sites at levels up to 2,600 milligrams/kilogram (mg/kg) and exceeded the MDEQ Part 201 RDCC.

Wayne County, through their contractor AKT Peerless, has performed investigation and remediation at numerous residential properties east of the Facility located from Grand Haven Avenue to Dequindre Avenue and from Caniff Avenue to Commor Avenue (**Attachment A**). Access was not gained to every property within the study area, leaving approximately 25% of the homes in the area uncharacterized. Multiple discrete samples were collected and analyzed within each of the 41 exposure units, then the values were reported based on the 95% upper confidence limit. The lead levels detected ranged from 170 mg/kg to 76,005 mg/kg. Approximately 29 exposure units have been or will be remediated due to lead levels that exceeded the MDEQ Part 201 RDCC. The residential area is bounded to the east by Interstate 75 (I-75) with continued residential use east of the expressway (approximately 500 ft. from the remediated properties on Dequindre Avenue). The extent of the lead contamination has not been defined by the work completed to date.

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter-related releases were present off-site and could be attributed to the former Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for the Facility.

Prior to sample collection, upwind and downwind sampling areas were established, 2,250 and 1,500 ft. from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or state owned properties located within these established areas.

The city and/or state owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual city or state owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, and photo documentation) were conducted as described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project*. City and/or State owned parcels were available in the upwind sample radius for the Facility. WESTON collected samples from 6 parcels near the Facility. Six City and/or State owned parcels were sampled in the up wind direction. Two composite samples were collected from each of the 6 upwind parcels. A total of 12 composite samples were collected

from the area upwind of the former smelter and are shown on the sample sketches included in **Attachment A**. AKT Peerless previously collected multiple discrete soil samples, for Wayne County, within 38 residential exposure units in the downwind direction.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky, Ms. Amanda Freeman, Ms. Shamille Lewis, and Mr. Erik Martinson conducted field sampling on 11 November 2003. WESTON personnel, Ms. Freeman and Ms. Lewis, completed field sampling on 3 and 4 December 2003. Six upwind city and/or state owned parcels were sampled. When the mailing address of a parcel was unable to be identified, the number of the nearest house was used. For example, a sampled parcel located next to a house at 532 Harmon Street, would be identified HAM – 00532. These changes were noted in the logbook and can be viewed in the “Summary of Sampled Properties” (**Attachment B**) and on the sample sketches (**Attachment A**). WESTON collected samples from six upwind city and/or state owned parcels. Two composite samples were collected from each of the six parcels for a total of 12 samples. There were 12 soil samples submitted for analysis. Two samples were designated as matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP. A previous sampling event by AKT Peerless submitted multiple discrete soil samples for analysis from 38 downwind residential exposure units.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- Multiple soil samples in the downwind direction resulting in average results for 38 Exposure Units (previously by AKT Peerless).

Sample locations from the upwind areas are listed in **Table 1** included in **Attachment B**. Sample locations from the downwind areas are shown in **Figure 2** included in **Attachment A**.

In accordance with the QASP, a total of 12 upwind samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. No samples collected from properties upwind of the former Facility contained concentrations of lead above the project screening level (400 milligrams/kilogram (mg/kg) established in the Phase I QASP. Twenty-nine samples collected from properties downwind of the former Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	0	53-380
Downwind	41	29	170-76005
Total	53	29	53-76005

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were chosen based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the City of Detroit Metropolitan Area. If smelting operations occurred, lead in soils resulting from aerial deposition would be found downwind in the northeast direction from the suspect Facility. Parcels ranging from 1,625 ft. to 2,250 ft. were chosen southwest in the upwind direction of the Facility. AKT Peerless previously sampled parcels ranging from 825 ft. to 1,500 ft. in the northeast direction. Elevated lead concentrations were found in the downwind direction of the Facility and low-level lead concentrations were found in the upwind direction. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus, the Phase I investigation was designed to determine if an off-site airborne release has occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind envelope.

In order to determine the distribution of the lead concentrations in soils as the distance from the Facility site increases, WESTON evaluated the lead concentration of samples versus the distance from the Facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated consistently low concentrations of lead in the upwind direction and elevated levels of lead in the downwind direction represented as decreasing concentrations with increasing distance from the Facility, a condition that would be expected if an aerial release of lead had occurred due to smelting operations.

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind log mean is 5.6 mg/kg and the upwind log mean is 5.0 mg/kg indicating the concentrations downwind are greater than the upwind concentrations. In addition the relative frequency histogram (**Attachment F**) for the downwind data shows a larger variation across the sample set than the upwind which contains a more even distribution relative to the lognormal curve. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data represent separate conditions.

4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility suggests that lead contamination detected in downwind locations may be attributable to historic releases from historic smelting operations at the property. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U. S. EPA Act 1994, as amended.

No samples collected from upwind of the Facility contained concentrations of lead above the 400 mg/kg screening level. However, lead concentrations in exceedance of the screening level were detected downwind of the Facility. The highest levels of lead (over 1,700 mg/kg) were found closest to the subject property. The downwind samples show a trend of decreasing concentration with increasing distance. The exceptions to this are five samples ranging from 3,158 mg/kg to 76,005 mg/kg located from 1,080 ft. to 1,350 ft. from the Facility. Lead concentrations consistently below the screening levels upwind and higher concentrations of lead that decrease with distance downwind of the former Facility is consistent with aerial deposition and suggests that such releases occurred from the Site during historic smelting operations at the Facility.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

Based on the evaluation of the Phase I analytical data, it is recommended that additional tasks be completed to further define the existing risk and the origin of the off-site contamination. The determination that additional work is necessary is based on three factors:

- The presence of residential receptors located within approximately 825 ft. downwind of the former Facility,
- Concentrations of lead in excess of the Part 201 Direct Contact Criteria screening level downwind of the Facility, and
- The pattern of lead concentrations within the study area suggests a strong potential that soils at downwind properties have been impacted by aerial deposition from releases of lead from historic smelting operations at the Facility.

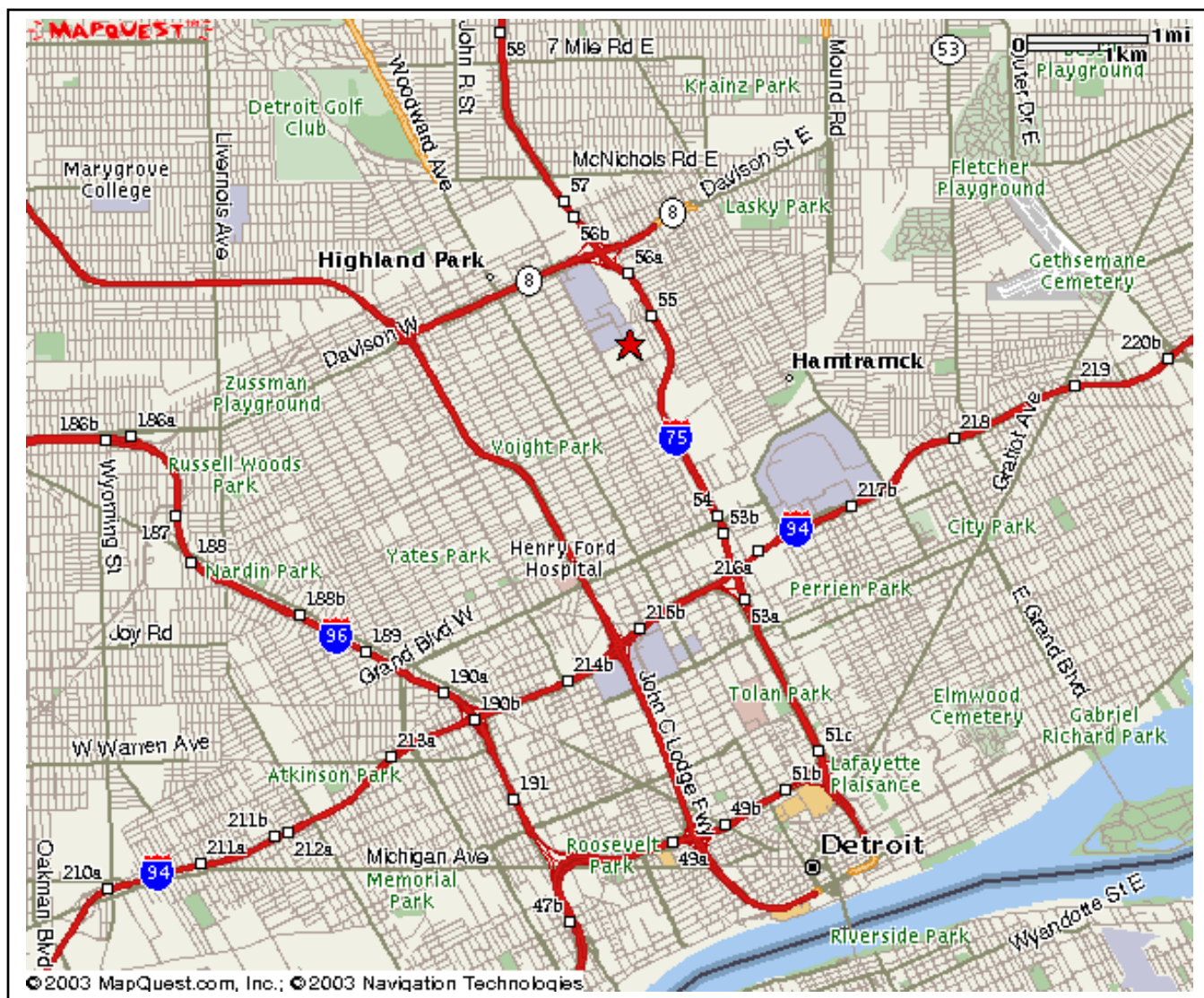
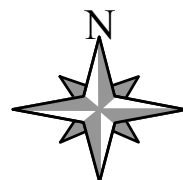
To address these concerns, it is recommended that the following additional tasks be completed:

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Facility operations;
 - Perform a Facility walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
11500 Russell Street



WESTON SOLUTIONS, INC. OF MICHIGAN



300 River Place, Suite 2800
Detroit, Michigan 48207

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001

AKT Peerless analytical data
- see following page

LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

- Sampling Locations
- Wind Direction
- Parcel Boundaries and Roads (Approximate)
- Facility of Concern

Note: All Lead, Total analytical results are shown in mg/kg.



PROJECT NAME:

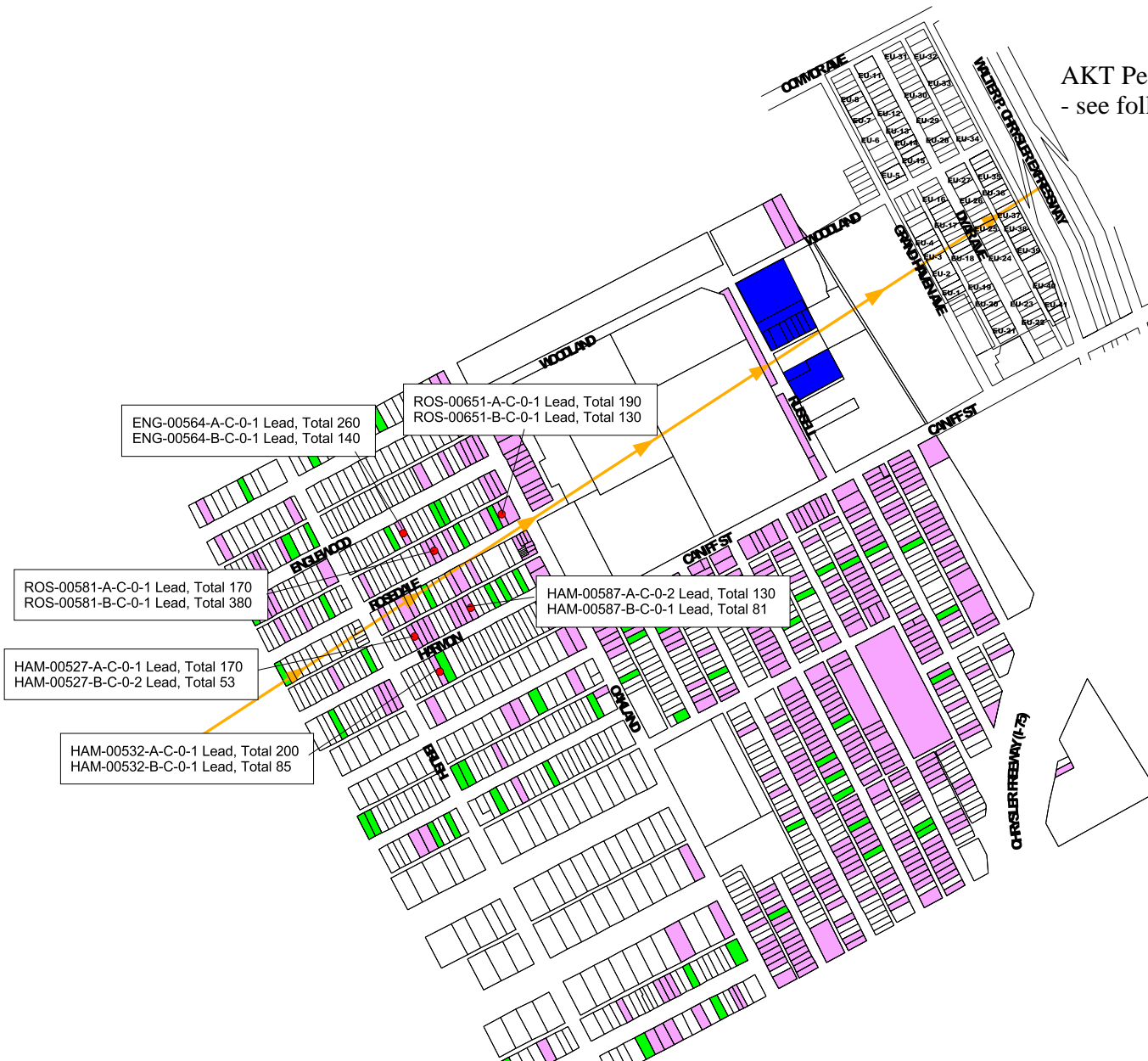
Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Continental Metal Company
11500 Russell Street
Federated Metals Division
11630 Russell Street

WORK ORDER No.: 20083.028.001	PROJECT MANAGER:
DRAWN BY: NJK	CHECKED BY:
DRAWING NAME:	DIRECTORY FOLDER: K:\169\ZLAP\09_08_03.apr
CONTRACT No.:	DELIVERY ORDER No.:
SCALE:	REPORT DATE:
DATE: September 2003	REVISION No.:
	FIGURE No.:



Continental Metals
AKT Peerless Analytical Results

Sample ID	Average Lead (mg/kg)
EU-1	380
EU-2	668
EU-3	469
EU-4	285
EU-5	306
EU-6	120
EU-7	239
EU-8	160
EU-11	226
EU-12	1332
EU-14	156
EU-15	216
EU-16	136
EU-17	255
EU-18	437
EU-19	243
EU-20	281
EU-21	401
EU-22	229
EU-23	207
EU-24	155
EU-25	526
EU-26	1451
EU-27	169
EU-28	394
EU-29	187
EU-30	320
EU-31	157
EU-32	163
EU-33	588
EU-34	175
EU-35	223
EU-36	250
EU-37	662
EU-38	312
EU-39	219
EU-40	285
EU-41	234

ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
527 Harmon	Vacant property located on the northwest side of Harmon St and directly northeast of a house at 519 Harmon.	HAM-00527-A-C-0-1
		HAM-00527-B-C-0-2
532 Harmon *	Vacant property located on the southeast side of Harmon St and directly southwest of a burned down abandoned house.	HAM-00532-A-C-0-1
		HAM-00532-B-C-0-1
564 Englewood	Vacant property on the south side of Englewood St. Front of property and Greenway were used due to fence.	ENG-00564-A-C-0-1
		ENG-00564-B-C-0-1
581 Rosedale	Vacant propety on the north side of Rosedale St and directly west of a house at 587 Rosedale.	ROS-00581-A-C-0-1
		ROS-00581-B-C-0-1
587 Harmon	Vacant property located on the north side of Harmon St and directly west of a house at 593 Harmon. Lot is enclosed with stakes and string.	HAM-00587-A-C-0-2
		HAM-00587-B-C-0-1
651 Rosedale	Vacant property located on the corner or Oakland and Rosedale St. The Bing Group Facility is across the street to the east.	ROS-00651-A-C-0-1
		ROS-00651-B-C-0-1
Downwind Properties		

Downwind Properties sampled previously by AKT Peerless Environmental Services

*Notes:

- 1) Property sampled was next to a burned down house at 532 Harmon.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
527 Harmon	HAM-00527-A-C-0-1	170
527 Harmon	HAM-00527-B-C-0-2	53
532 Harmon*	HAM-00532-A-C-0-1	200
532 Harmon*	HAM-00532-B-C-0-1	85
564 Englewood	ENG-00564-A-C-0-1	260
564 Englewood	ENG-00564-B-C-0-1	140
581 Rosedale	ROS-00581-A-C-0-1	170
581 Rosedale	ROS-00581-B-C-0-1	380
587 Harmon	HAM-00587-A-C-0-2	130
587 Harmon	HAM-00587-B-C-0-1	81
651 Rosedale	ROS-00651-A-C-0-1	190
651 Rosedale	ROS-00651-B-C-0-1	130
Downwind		
	EU-1	380
	EU-2	668
	EU-3	469
	EU-4	285
	EU-5	306
	EU-6	120
	EU-7	239
	EU-8	160
	EU-11	226
	EU-12	1332
	EU-14	156
	EU-15	216
	EU-16	136
	EU-17	255
	EU-18	437
	EU-19	243
	EU-20	281
	EU-21	401
	EU-22	229
	EU-23	207
	EU-24	155
	EU-25	526
	EU-26	1451
	EU-27	169
	EU-28	394
	EU-29	187
	EU-30	320
	EU-31	157

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Downwind cont'd		
	EU-32	163
	EU-33	588
	EU-34	175
	EU-35	223
	EU-36	250
	EU-37	662
	EU-38	312
	EU-39	219
	EU-40	285
	EU-41	234

*Notes:

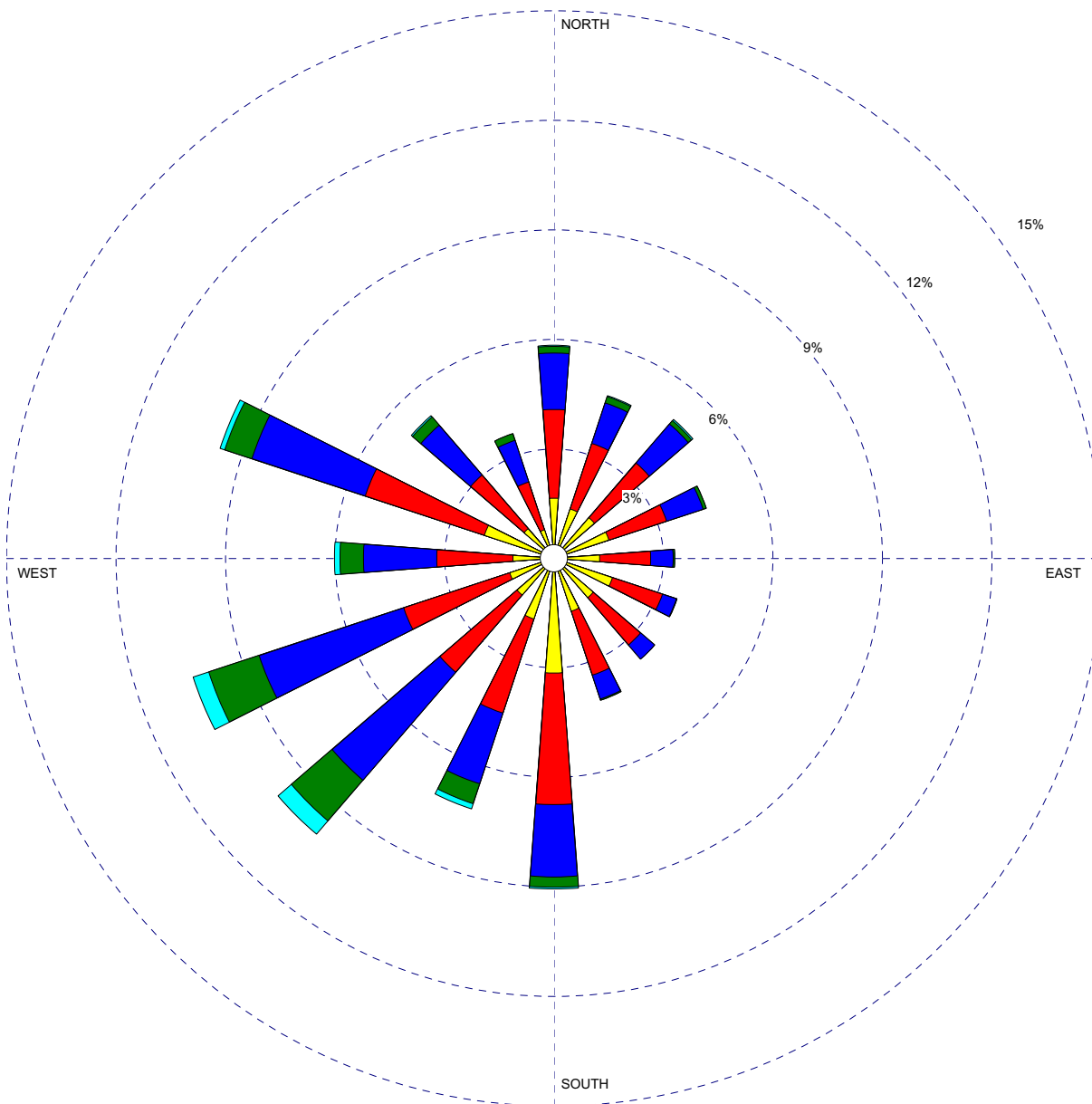
- 1) Bold indicates results equal to or greater than to 400 mg/kg.
- 2) All downwind property information was taken from AKTPEERLESS Environmental Services.
- 3) Sample collected at 532 Harmon was actually collected on the vacant lot next to that address.

ATTACHMENT C

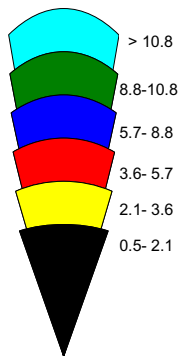
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

Former Federated Metals Division – 11630 Russell

527 Harmon – Vacant property located on the northwest side of Harmon St and directly northeast of a house at 519 Harmon.

Looking southeast along the vacant property at 5 discrete sample A locations.



Looking northwest along the vacant property at 5 discrete sample B locations.



Looking northwest along the property at the total sampling area.



Russell (cont'd)

532 Harmon – Vacant property located on the southeast side of Harmon St and directly southwest of a burned down abandoned house.

Looking southeast along the vacant property at 5 discrete sample A locations.



Looking northwest along the vacant property at 5 discrete sample B locations.



Looking northwest along the property at the total sampling area.



Russell (cont'd)

564 Englewood – Vacant property located on the south side of Englewood St. The front of the property and greenway were used due to a fence.

Looking southwest along the property at 5 discrete sample A locations.



Looking northwest along the greenway at 5 discrete sample B locations.



Looking south along the property at the total sampling area.



Russell (cont'd)

581 Rosedale – Vacant property located on the north side of Rosedale St and directly west of a house at 587 Rosedale.

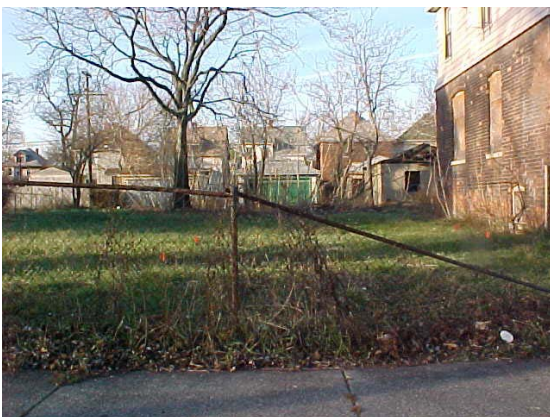
Looking east along the property at 5 discrete sample A locations.



Looking northeast along the property at 5 discrete sample B locations.



Looking north along the property at the total sampling area.



Russell (cont'd)

587 Harmon – Vacant property located on the north side of Harmon St and directly west of a house at 593 Harmon. Lot is enclosed with stakes and string.

Looking south along the vacant property at 5 discrete sample A locations.



Looking north along the vacant property at 5 discrete sample B locations.



Looking north along the property at the total sampling area.



Russell (cont'd)

651 Rosedale – Vacant property located on the corner of Oakland and Rosedale St. The Bing Group Facility is across the street to the east.

Looking southwest and west, respectively, along the vacant property at 5 total discrete sample A locations.

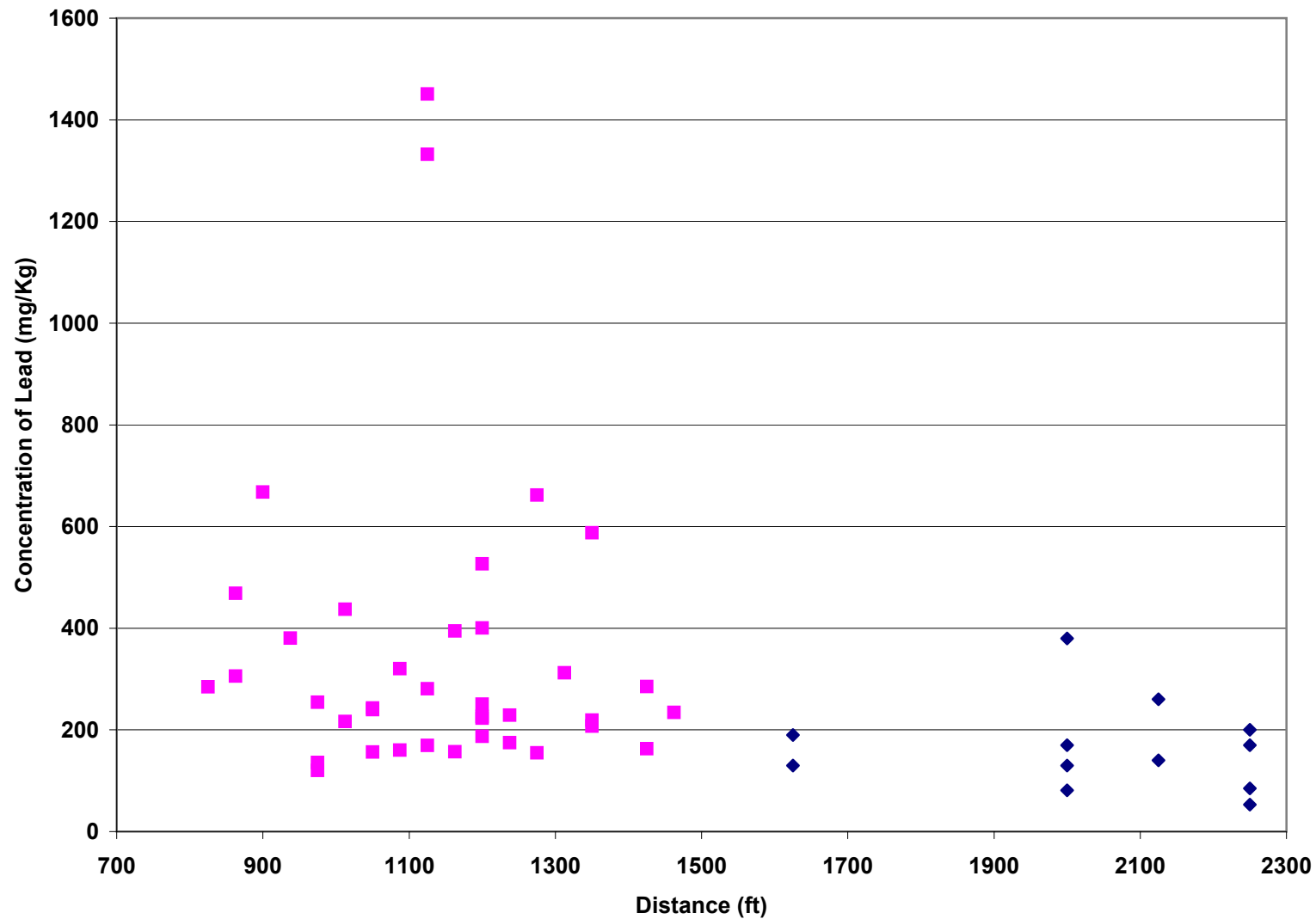


Looking north along the vacant property at 5 discrete sample B locations.



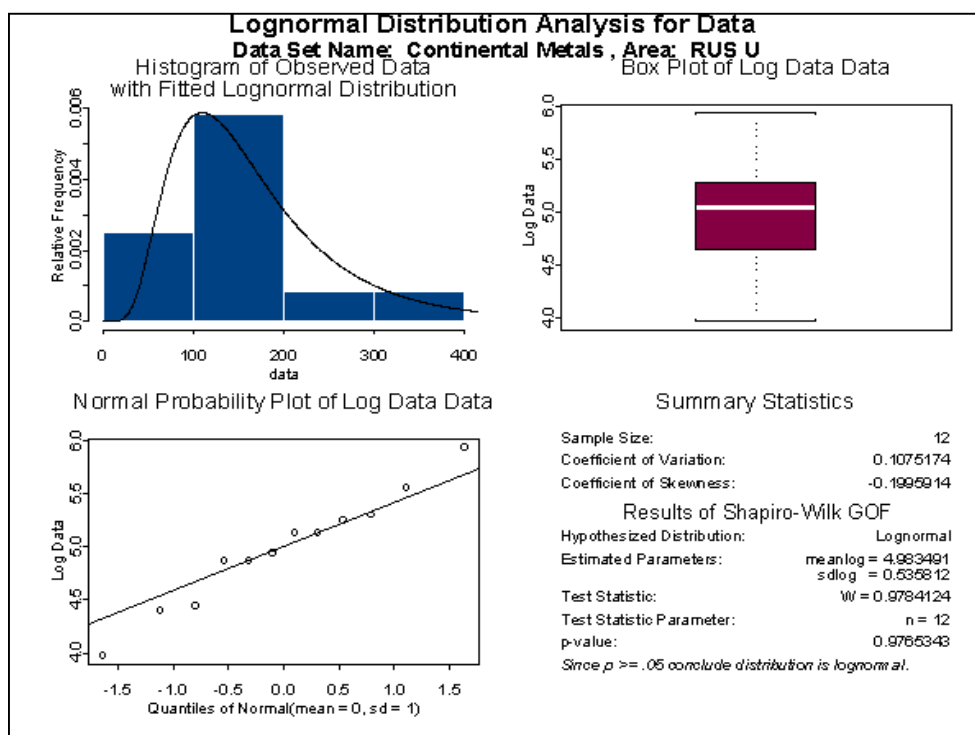
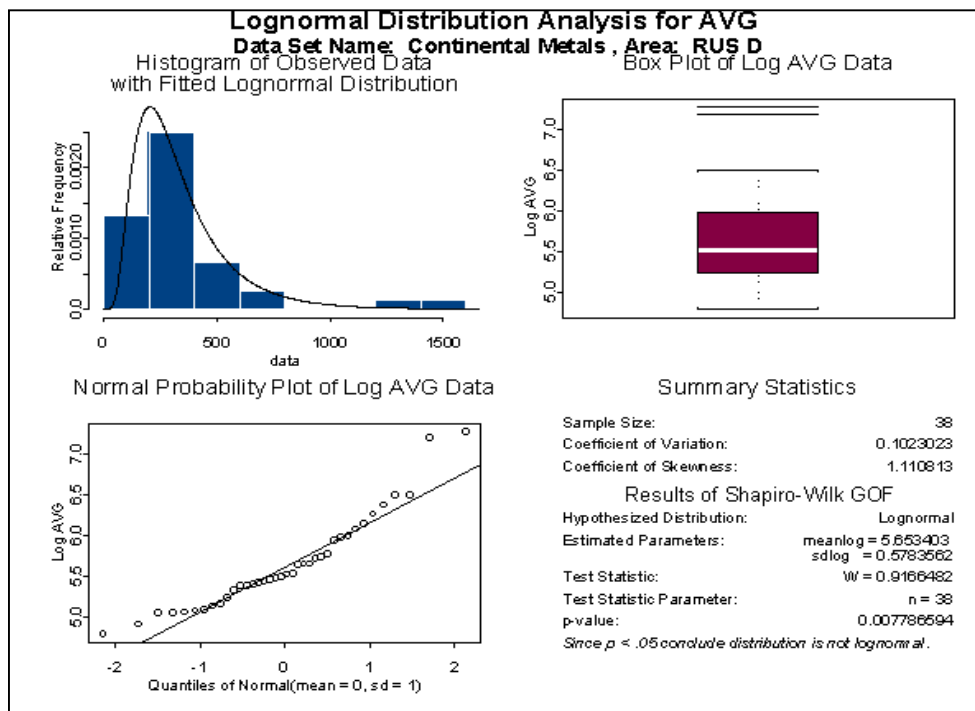
ATTACHMENT E
CONCENTRATION GRAPH

11500 Russell



ATTACHMENT F
STATISTICAL DISTRIBUTION

CONTINENTAL METALS STATISTICAL DISTRIBUTION



Appendix F

Federated Metals Division Phase I Summary Report

DRAFT

**PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
FEDERATED METALS DIVISION – 11630 RUSSELL STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place
Suite 2-300
3058 West Grand Boulevard
Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.

2501 Jolly Road
Suite 100
Okemos, Michigan 48864

February 2004

W.O. No.: 20083.028.001

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Federated Metals Division (the Facility), 11630 Russell Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 11 November and 3 through 4 December 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. Review of the data concluded that the lead found was consistent with deposition resulting from aerial releases and suggested that such releases occurred during historic smelting operations at the Facility. As a result of these findings additional work is recommended. To address these concerns, it is recommended that the following additional tasks be completed:

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Facility operations;
 - Perform a Facility walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

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LIST OF APPENDICES

Title

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Attachment B	Tables
Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to perform off-site sampling activities for the Detroit Lead Assessment Project in Detroit, Wayne County, Michigan. This report addresses work that was conducted in the vicinity of the former Federated Metals Division (the Facility), 11630 Russell Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Sampling Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Sampling Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Sampling Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations, and
- **Attachment E** – Concentration Graph

- **Attachment F** – Statistical Distribution

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 11630 Russell Street in Detroit, Wayne County Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the Facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

Federated Metals Division was located at 11630 Russell Street in Detroit, Wayne County, Michigan (Detroit Metropolitan Area). The Facility appears to be in use and owned by Brimar. The areas five blocks to the north, south, and west of the Facility are industrial. The area east of the Facility is industrial for two blocks and residential for at least the next three blocks.

2.1.2 Site History

Review of the Bresser's city directory indicated that Federated Metals Division owned the property from 1946 to 1951. Co-owners were Amer Smelting & Refng in 1946 to 1951. The address was not listed in 1961. Sullivan Eqpt Co from 1971 to 1981, Sullivan Investment in 1991, and Brimar Corporation from 1996 to the present owned the property.

Review of the Sanborn maps for this address show the following chronology: 1968 Sullivan Equip Co present with stock stge, shipping and wash rm, processing rm, metal warehouse, smelting rm, and chlorine stage; 1970-1990 Sullivan Equip Co still present with stock stge,

shipping and wash rm, processing rm, metal warehouse, smelting rm, and chlorine stage; 1993-1997 Brimar M present with stock stge, shipping and wash rm, processing rm, metal warehouse, smelting rm, and chlorine stage.

The aerial photograph review indicated this area was industrialized from 1957 to the present with residential use areas within 1,000 ft. east and three blocks south of the Facility. Structures identified from the most recent aerial photograph (2003 GlobeXplorer™) include a large building, which occupies most of the property with small undeveloped areas to the east and west. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the fire records, no records were found.

Review of the BEA for “Several Parcels near Russell and Holbrook Street”, dated August 1995, prepared by Vision Environmental Inc. for American Axle and Manufacturing Inc., indicates that lead was detected on the Sites at levels up to 2,600 milligrams/kilogram (mg/kg) and exceeded the MDEQ Part 201 Residential Direct Contact Criterion (RDCC).

Wayne County, through their contractor, AKT Peerless, has performed investigation and remediation at numerous residential properties east of the Facility located from Grand Haven Avenue to Dequindre Avenue and from Caniff Avenue to Commor Avenue (**Attachment A**). Access was not gained to every property within the study area, leaving approximately 25% of the homes in the area uncharacterized. Multiple discrete samples were collected and analyzed within each of the 39 exposure units, then the values were reported based on the 95% upper confidence limit. The lead levels detected ranged from 170 mg/kg to 76,005 mg/kg. Approximately 29 exposure units have been or will be remediated due to lead levels that exceeded the MDEQ Part 201 RDCC. The residential area is bounded to the east by Interstate 75 (I-75) with continued residential use east of the expressway (approximately 500 ft. from the remediated properties on Dequindre Avenue). The extent of the lead contamination has not been defined by the work completed to date.

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead consistent with smelter-related releases were present off-site and could be attributed to the Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for this property.

Prior to sample collection, upwind and downwind sampling areas were established, 2,250 and 1,500 ft. from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from City and/or State owned properties located within these established areas.

The City and/or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual City or State owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, photo documentation) were conducted as described in the *Phase I Overall Sampling Report for the Detroit Lead Assessment Project*. City and/or State owned parcels were available in the upwind sample radius for the Facility. WESTON collected samples from six parcels near the Facility. Six City and/or State owned parcels were sampled in the upwind direction. Two composite samples were collected from each of the six upwind parcels. A total of 12 composite samples were collected from the area upwind

of the Facility and are shown on the sample sketches included in **Attachment A**. AKT Peerless previously collected multiple discrete soil samples, for Wayne County, within 41 residential exposure units in the downwind direction.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky, Ms. Amanda Freeman, Ms. Shamille Lewis, and Mr. Erik Martinson conducted field sampling on 11 November 2003. WESTON personnel, Ms. Freeman and Ms. Lewis, completed field sampling on 3 and 4 December 2003. Six upwind City and/or State owned parcels were available. When the mailing address of a parcel was unable to be identified, the number of the nearest house was used. For example, a sampled parcel located next to a house at 532 Harmon Street, would be identified as HAM – 00532. These changes were noted in the logbook and can be viewed on the “Summary of Sampled Properties” (located in **Attachment B**) and the sample sketches (located in **Attachment A**). WESTON collected samples from six upwind City and/or State owned parcels. Two composite samples were collected from each of the six parcels for a total of 12 samples. Twelve soil samples submitted for analysis. Two samples were designated matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP. AKT Peerless during a previous sampling event submitted multiple discrete soil samples for analysis from 38 downwind residential exposure units.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling, the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- Multiple soil samples in the downwind direction resulting in average results for 38 Exposure Units (previously by AKT Peerless).

Sample locations from the upwind areas are listed in **Table 1** included in **Attachment B**. Sample locations from the downwind areas are shown in **Figure 2** included in **Attachment A**.

In accordance with the QASP, a total of 12 upwind samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. Samples collected from properties upwind of the former Facility did not contain concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. Twenty-nine samples collected from properties downwind of the former Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	0	53-380
Downwind	41	29	170-76,005
Total	53	29	53-76,005

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were chosen based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind

rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the City of Detroit Metropolitan Area. If smelting operations occurred, lead in soils resulting from aerial deposition would be found downwind in the northeast direction from the suspect Facility. Parcels ranging from 1,625 feet to 2,250 feet were chosen southwest in the upwind direction from of the Facility. AKT Peerless previously sampled parcels ranging from 825 ft. to 1,500 ft. in the northeast direction from the facility. Elevated lead concentrations were found in the downwind direction of the Facility and low-level lead concentrations were found in the upwind direction. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus, the Phase I investigation was designed to determine if an off-site airborne release had occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind envelope.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the Facility by graphing the data in relation to each other. Evaluation of this graph (see **Attachment E**) indicated consistently low concentrations of lead in the upwind direction and elevated levels of lead in the downwind direction represented as decreasing concentrations with increasing distance from the Facility, a condition that would be expected if an aerial release of lead had occurred due to smelting operations.

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As

shown on the distribution analysis figures included in **Attachment F** the downwind log mean is 5.6 mg/kg and the upwind log mean is 5.0 mg/kg indicating the concentrations downwind are greater than the upwind concentrations. In addition the relative frequency histogram (**Attachment F**) for the downwind data shows a larger variation across the sample set than the upwind which contains a more even distribution relative to the lognormal curve. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data represent separate conditions.

4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility suggests that lead contamination detected in downwind locations may be attributable to historic releases from historic smelting operations at the property. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U. S. EPA Act 1994, as amended.

No samples collected from upwind of the Facility contained concentrations of lead above the 400 mg/kg screening level. However, lead concentrations in exceedance of the screening level were detected downwind of the Facility. The downwind samples show a trend of decreasing concentration with increasing distance with the highest levels of lead (over 1,700 mg/kg) closest to the subject property. The exceptions to this are five samples ranging from 3,158 mg/kg to 76,005 mg/kg located from 1,080 ft. to 1,350 ft. from the Facility. This pattern of low concentrations of lead upwind and higher concentrations of lead with decreasing concentrations downwind of the Facility is consistent with deposition patterns from aerial releases and suggests that such releases occurred from the Facility during historic smelting operations.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

Based on the evaluation of the Phase I analytical data, it is recommended that additional tasks be completed to further define the existing risk and the origin of the off-site contamination. The determination that additional work is necessary is based on three factors:

- The presence of residential receptors located within approximately 825 ft. downwind of the former Facility,
- Concentrations of lead in excess of the Part 201 Direct Contact Criteria screening level downwind of the Facility, and
- The pattern of lead concentrations within the study area suggests a strong potential that soils at downwind properties have been impacted by aerial deposition from releases of lead from historic smelting operations at the Facility.

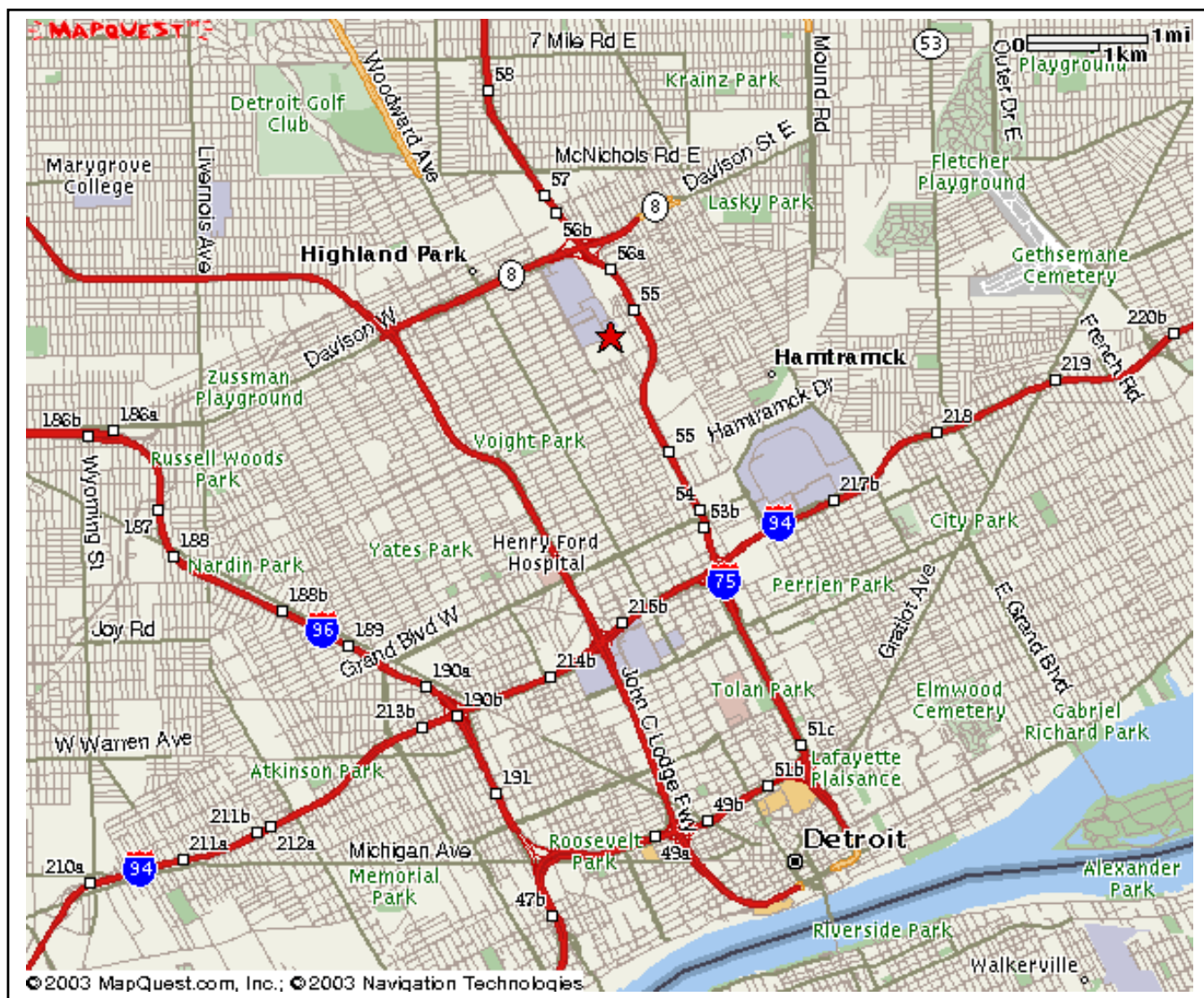
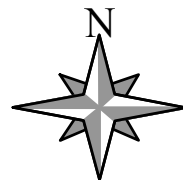
To address these concerns, it is recommended that the following additional tasks be completed:

- Obtain access to the suspected source property for:
 - Review of existing information related to property transfer (Phase I, Phase II, and development planning);
 - Interview past employees regarding historical Site operations;
 - Perform a Site walk to determine existing conditions;
 - Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible); and
- Collect soil samples from additional downwind properties to determine the extent of downwind contamination.

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
11630 Russell Street



WESTON SOLUTIONS, INC. OF MICHIGAN



300 River Place, Suite 2800
Detroit, Michigan 48207

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001

AKT Peerless analytical data
- see following page

LEGEND:

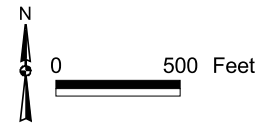
EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

- Sampling Locations
- Wind Direction
- Parcel Boundaries and Roads (Approximate)
- Facility of Concern

Note: All Lead, Total analytical results are shown in mg/kg.



PROJECT NAME:

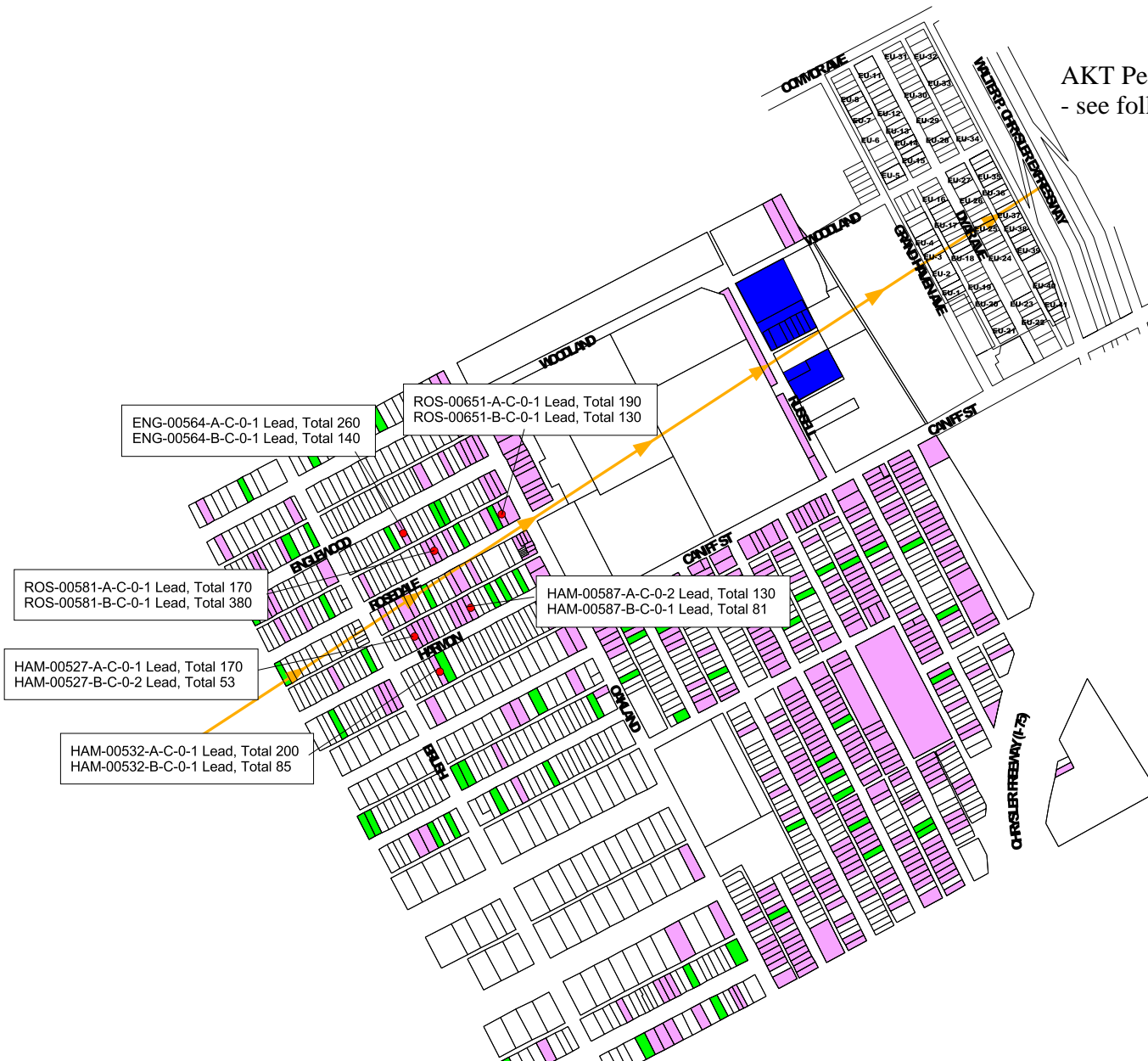
Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Continental Metal Company
11500 Russell Street
Federated Metals Division
11630 Russell Street

WORK ORDER No.: 20083.028.001	PROJECT MANAGER:
DRAWN BY: NJK	CHECKED BY:
DRAWING NAME:	DIRECTORY FOLDER: K:\169\ZLAP\09_08_03.apr
CONTRACT No.:	DELIVERY ORDER No.:
SCALE:	REPORT DATE:
DATE: September 2003	REVISION No.:
	FIGURE No.:



Federated Metals
AKT Peerless Analytical Results

Sample ID	Average Lead (mg/kg)
EU-1	380
EU-2	668
EU-3	469
EU-4	285
EU-5	306
EU-6	120
EU-7	239
EU-8	160
EU-11	226
EU-12	1332
EU-14	156
EU-15	216
EU-16	136
EU-17	255
EU-18	437
EU-19	243
EU-20	281
EU-21	401
EU-22	229
EU-23	207
EU-24	155
EU-25	526
EU-26	1451
EU-27	169
EU-28	394
EU-29	187
EU-30	320
EU-31	157
EU-32	163
EU-33	588
EU-34	175
EU-35	223
EU-36	250
EU-37	662
EU-38	312
EU-39	219
EU-40	285
EU-41	234

ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
527 Harmon	Vacant property located on the northwest side of Harmon St and directly northeast of a house at 519 Harmon.	HAM-00527-A-C-0-1
		HAM-00527-B-C-0-2
532 Harmon *	Vacant property located on the southeast side of Harmon St and directly southwest of a burned down abandoned house.	HAM-00532-A-C-0-1
		HAM-00532-B-C-0-1
564 Englewood	Vacant property on the south side of Englewood St. Front of property and Greenway were used due to fence.	ENG-00564-A-C-0-1
		ENG-00564-B-C-0-1
581 Rosedale	Vacant propety on the north side of Rosedale St and directly west of a house at 587 Rosedale.	ROS-00581-A-C-0-1
		ROS-00581-B-C-0-1
587 Harmon	Vacant property located on the north side of Harmon St and directly west of a house at 593 Harmon. Lot is enclosed with stakes and string.	HAM-00587-A-C-0-2
		HAM-00587-B-C-0-1
651 Rosedale	Vacant property located on the corner or Oakland and Rosedale St. The Bing Group Facility is across the street to the east.	ROS-00651-A-C-0-1
		ROS-00651-B-C-0-1
Downwind Properties		

Downwind Properties sampled previously by AKT Peerless Environmental Services

*Notes:

- 1) Property sampled was next to a burned down house at 532 Harmon.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
527 Harmon	HAM-00527-A-C-0-1	170
527 Harmon	HAM-00527-B-C-0-2	53
532 Harmon*	HAM-00532-A-C-0-1	200
532 Harmon*	HAM-00532-B-C-0-1	85
564 Englewood	ENG-00564-A-C-0-1	260
564 Englewood	ENG-00564-B-C-0-1	140
581 Rosedale	ROS-00581-A-C-0-1	170
581 Rosedale	ROS-00581-B-C-0-1	380
587 Harmon	HAM-00587-A-C-0-2	130
587 Harmon	HAM-00587-B-C-0-1	81
651 Rosedale	ROS-00651-A-C-0-1	190
651 Rosedale	ROS-00651-B-C-0-1	130
Downwind		
	EU-1	380
	EU-2	668
	EU-3	469
	EU-4	285
	EU-5	306
	EU-6	120
	EU-7	239
	EU-8	160
	EU-11	226
	EU-12	1332
	EU-14	156
	EU-15	216
	EU-16	136
	EU-17	255
	EU-18	437
	EU-19	243
	EU-20	281
	EU-21	401
	EU-22	229
	EU-23	207
	EU-24	155
	EU-25	526
	EU-26	1451
	EU-27	169
	EU-28	394
	EU-29	187
	EU-30	320
	EU-31	157

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Downwind cont'd		
	EU-32	163
	EU-33	588
	EU-34	175
	EU-35	223
	EU-36	250
	EU-37	662
	EU-38	312
	EU-39	219
	EU-40	285
	EU-41	234

*Notes:

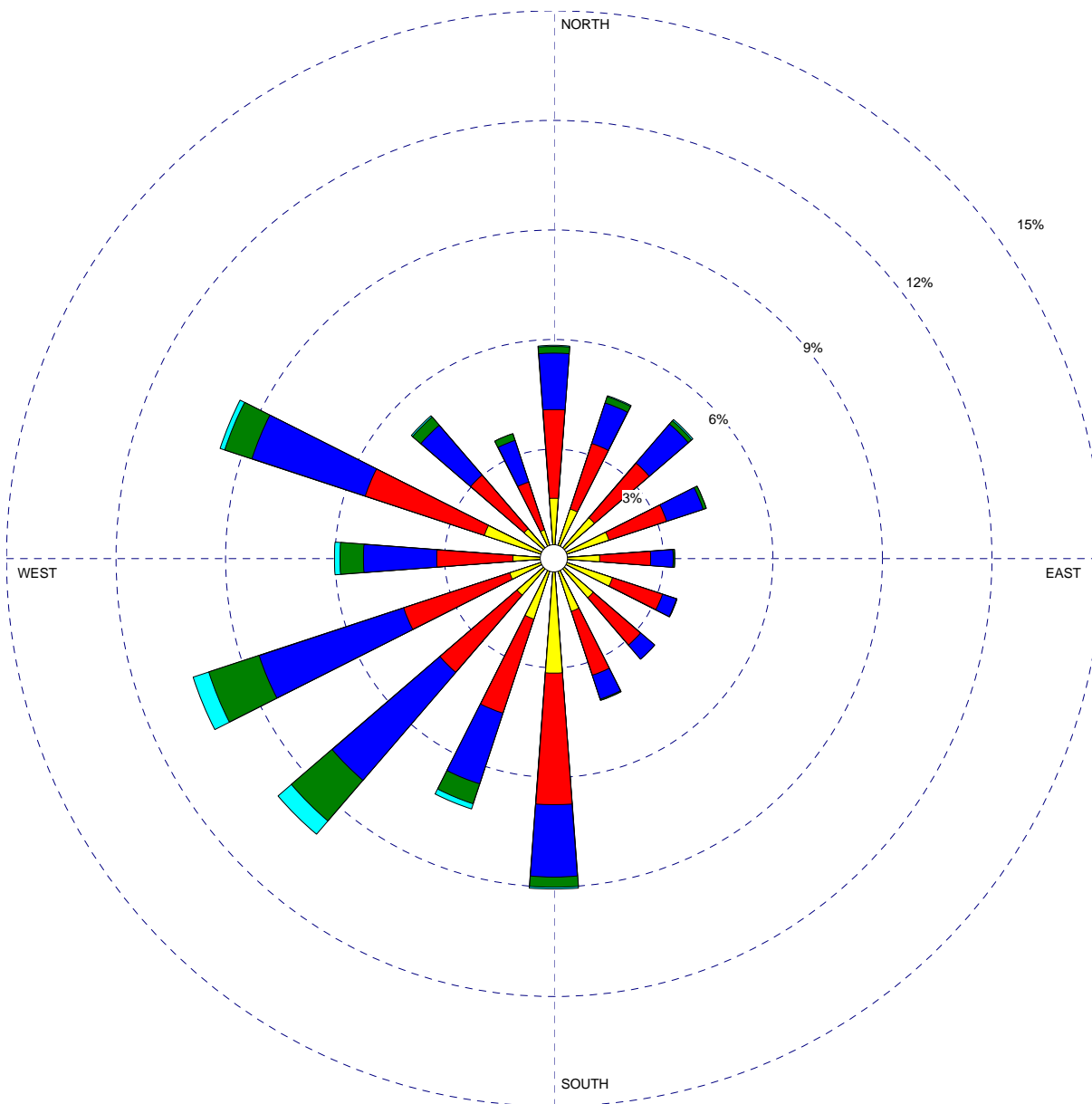
- 1) Bold indicates results equal to or greater than to 400 mg/kg.
- 2) All downwind property information was taken from AKTPEERLESS Environmental Services.
- 3) Sample collected at 532 Harmon was actually collected on the vacant lot next to that address.

ATTACHMENT C

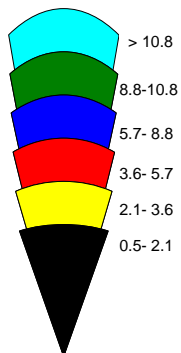
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

Former Federated Metals Division – 11630 Russell

527 Harmon – Vacant property located on the northwest side of Harmon St and directly northeast of a house at 519 Harmon.

Looking southeast along the vacant property at 5 discrete sample A locations.



Looking northwest along the vacant property at 5 discrete sample B locations.



Looking northwest along the property at the total sampling area.



Russell (cont'd)

532 Harmon – Vacant property located on the southeast side of Harmon St and directly southwest of a burned down abandoned house.

Looking southeast along the vacant property at 5 discrete sample A locations.



Looking northwest along the vacant property at 5 discrete sample B locations.



Looking northwest along the property at the total sampling area.



Russell (cont'd)

564 Englewood – Vacant property located on the south side of Englewood St. The front of the property and greenway were used due to a fence.

Looking southwest along the property at 5 discrete sample A locations.



Looking northwest along the greenway at 5 discrete sample B locations.



Looking south along the property at the total sampling area.



Russell (cont'd)

581 Rosedale – Vacant property located on the north side of Rosedale St and directly west of a house at 587 Rosedale.

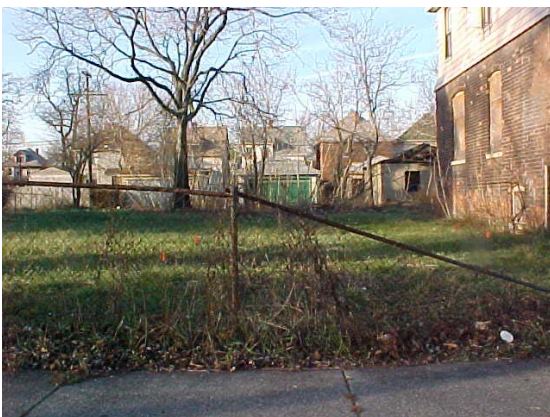
Looking east along the property at 5 discrete sample A locations.



Looking northeast along the property at 5 discrete sample B locations.



Looking north along the property at the total sampling area.



Russell (cont'd)

587 Harmon – Vacant property located on the north side of Harmon St and directly west of a house at 593 Harmon. Lot is enclosed with stakes and string.

Looking south along the vacant property at 5 discrete sample A locations.



Looking north along the vacant property at 5 discrete sample B locations.



Looking north along the property at the total sampling area.



Russell (cont'd)

651 Rosedale – Vacant property located on the corner of Oakland and Rosedale St. The Bing Group Facility is across the street to the east.

Looking southwest and west, respectively, along the vacant property at 5 total discrete sample A locations.

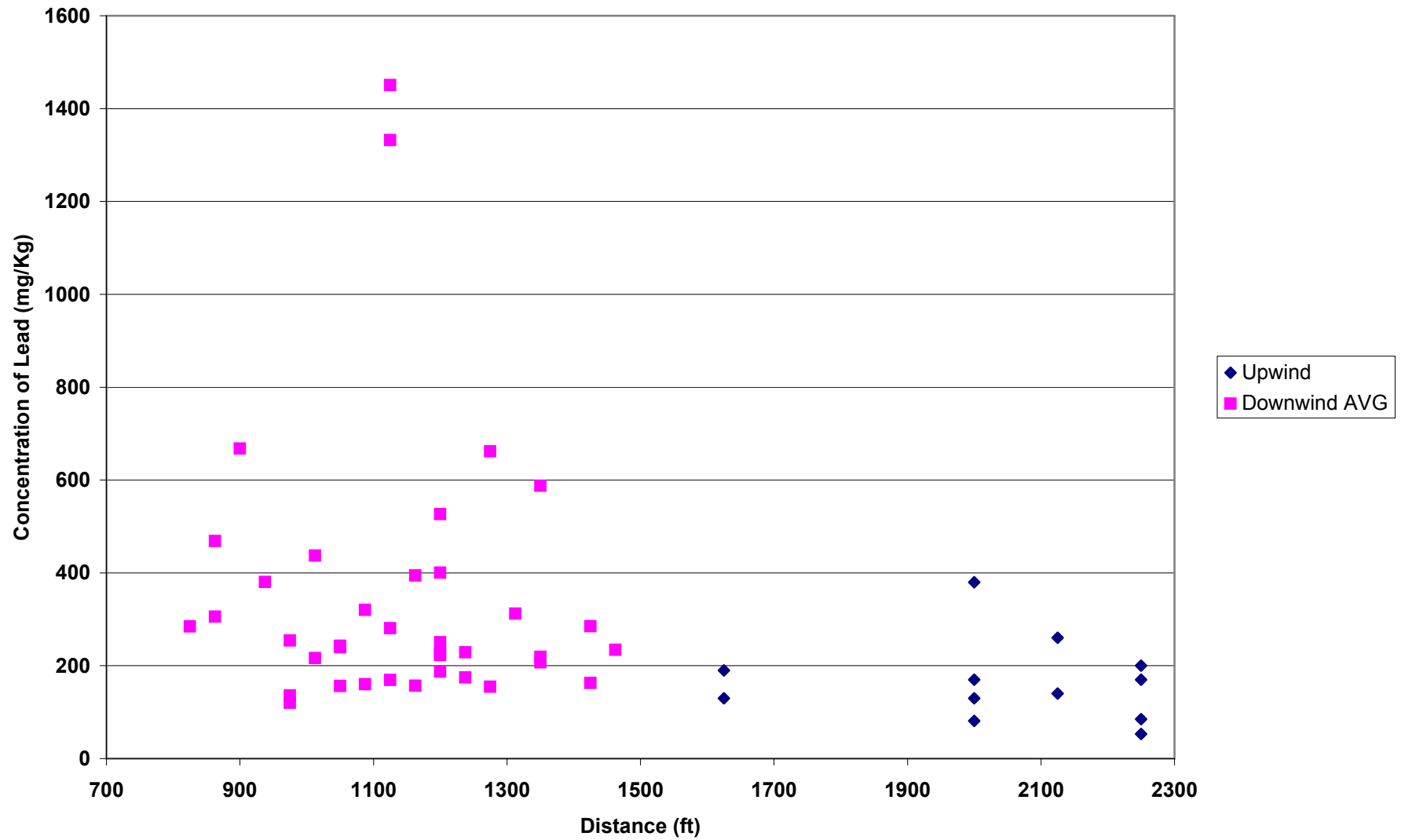


Looking north along the vacant property at 5 discrete sample B locations.



Attachment E
CONCENTRATION GRAPH

11630 Russell



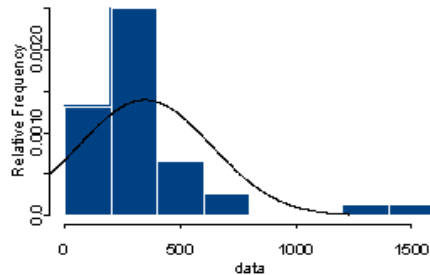
ATTACHMENT F
STATISTICAL DISTRIBUTION

FEDERATED METALS STATISTICAL DISTRIBUTION

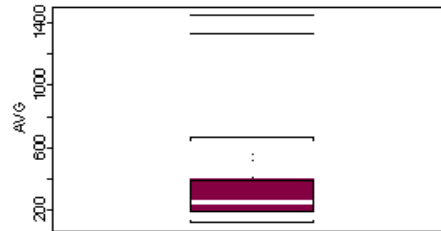
Normal Distribution Analysis for AVG

Data Set Name: Federated Metals , Area: RUS D

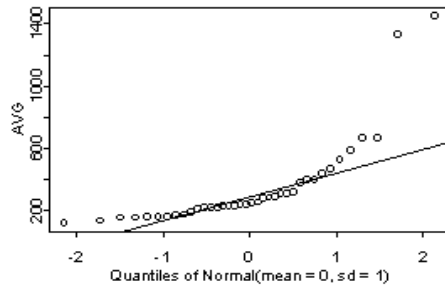
Histogram of Observed Data
with Fitted Normal Distribution



Box Plot of AVG Data



Normal Probability Plot of AVG Data



Summary Statistics

Sample Size: 38
Coefficient of Variation: 0.823795
Coefficient of Skewness: 2.7805

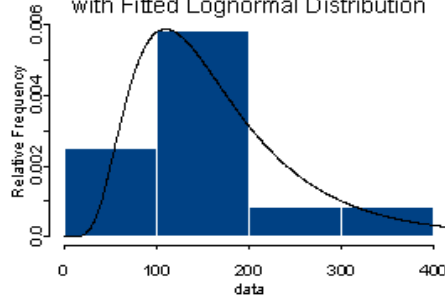
Results of Shapiro-Wilk GOF

Hypothesized Distribution: Normal
Estimated Parameters: mean = 347.8091
sd = 286.5235
Test Statistic: W = 0.652543
Test Statistic Parameter: n = 38
p-value: 3.086887 e-8
Since $p < .05$ conclude distribution is not normal.

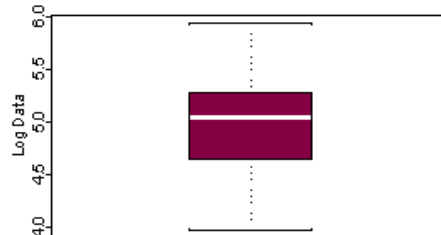
Lognormal Distribution Analysis for Data

Data Set Name: Federated Metals , Area: RUS U

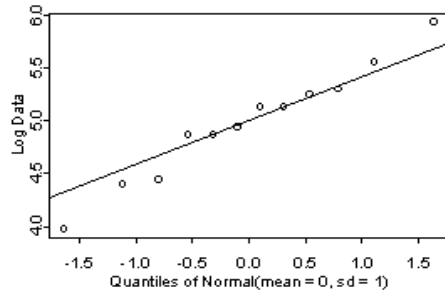
Histogram of Observed Data
with Fitted Lognormal Distribution



Box Plot of Log Data Data



Normal Probability Plot of Log Data Data



Summary Statistics

Sample Size: 12
Coefficient of Variation: 0.1075174
Coefficient of Skewness: -0.1995914

Results of Shapiro-Wilk GOF

Hypothesized Distribution: Lognormal
Estimated Parameters: meanlog = 4.983491
sdlog = 0.636812
Test Statistic: W = 0.9784124
Test Statistic Parameter: n = 12
p-value: 0.9765343
Since $p \geq .05$ conclude distribution is lognormal.

Appendix G

Detroit Lead Pipe Works Phase I Summary Report

DRAFT

**PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
DETROIT LEAD PIPE WORKS – 7001 LYNDON STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place

Suite 2-300

3058 West Grand Boulevard

Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.

2501 Jolly Road

Suite 100

Okemos, MI 48864

February 2004

W.O. No. 20083.028.001

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Detroit Lead Pipe Works (the Facility), 7001 Lyndon Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 13 November and 4 December 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. The results of this investigation do not indicate that downwind soils at properties have been impacted by releases of lead from the Facility as a result of aerial deposition related to historic smelting operations. However, one sample in the downwind deposition area is greater than the screening level it is recommended that additional soil samples be collected from additional properties located within 1500 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical Site operations;
- Perform a Site walk to determine existing conditions; and
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

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LIST OF ATTACHMENTS

Title

Attachment A	Figures
Attachment B	Tables
Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Detroit Lead Pipe Works (the Facility), 7001 Lyndon Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Summary Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E** – Concentration Graph,

- **Attachment F**– Statistical Distribution.

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 7001 Lyndon Street in Detroit, Wayne County Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the Facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility appears to be a building in good condition. Detroit Lead Pipe Works is engraved into a cement sign on the front of the building with the year 1941. There is a fence that extends from the east and west sides of the building around the back and encloses the property. The area five blocks north of the Facility is residential. The areas five blocks south and west of the Facility are industrial. The area five blocks east of the Facility is a combination of industrial and commercial.

2.1.2 Site History

Review of the Bresser's city directory indicated that Detroit Lead Pipe Works owned the property from 1946 to 1996. Co-owners of this property included: AAA Lead Shielding, AAA Notch Bar Lead, AAA Sheet Lead Company, and AAA Solder Company from 1981 to 1996. There was no listing for the present address in 2003.

Review of the Sanborn maps for this address showed that from 1950 through 2002, Detroit Lead Pipe Works, Inc. is present with steel truss concrete foundation and a lead furnace.

The aerial photograph review indicated this address was industrialized from 1957 to the present with heavy residential area beginning 300 feet (ft.) to the north. Structures identified from the most recent aerial photograph (2003 GlobeXplorer™) include a larger building in the center of the property with several smaller structures to the east. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the fire records, an inspection report was located stating that this was a lead cutting plant.

Review of the BEA for nearby “7401 Lyndon Street”, dated September 1999, prepared by Clayton Environmental for the XYX-Detroit Inc., indicates that lead was detected at levels between 3.0 to 14 mg/kg and did not exceed the MDEQ Part 201 RDCC.

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter related releases were present off-site and could be attributed to the former Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for this property.

Prior to sample collection, upwind and downwind sampling areas were established, 2,550 and 1,800 ft. from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or state owned properties located within these established areas.

The city and/or state owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual city and/or state owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, photo documentation) were conducted as described in the “*Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project*”. Because no state or city owned parcels were available in the sample radius for the Facility, WESTON collected samples from 10 city and/or state owned parcels and two greenways near the suspected former smelter Facility. Four city and/or state owned parcels and two greenways were sampled in the downwind direction, and six city and/or state owned parcels

were sampled in the upwind direction due to size and availability of the properties. Two composite samples were collected from each of the four downwind parcels and two greenways, and all six of the upwind parcels. Twenty four composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky and Ms. Shamille Lewis, conducted field sampling on 13 November 2003. Ms. Lewis and Ms. Freeman completed field sampling on 4 December 2003. Since 12 city and/or state owned parcels were not available, WESTON selected two greenways, prior to the sampling event, and submitted them to the City of Detroit to obtain their approval and access. Any changes to field sample identifications were noted in the logbook and can be viewed on the “Summary Table For Sample Properties” (**Attachment B**) and the sample sketches (**Attachment A**). WESTON collected two samples from each of the six upwind city and/or state owned parcels for a total of 12 upwind samples. Also, two samples were taken from each of the four city and/or state owned parcels and two downwind greenways for a total of 12 downwind samples. Twenty four soil samples were submitted for analysis. Five samples were designated as matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- 12 composite soil samples in the downwind direction.

Sample locations from both the upwind and downwind areas are listed in **Table 1** included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. Samples collected from properties upwind of the former Facility did not contain concentrations of lead above the project screening level (400 milligrams/kilogram [mg/kg]) established in the Phase I QASP. One sample collected from properties downwind of the former Facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	0	43-170
Downwind	12	1	40-490
Total	24	1	40-490

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were selected based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the City of Detroit Metropolitan Area. If smelting operations occurred, lead in soils resulting from aerial deposition would be detected downwind in the northeast direction from the Facility. Parcels ranging from 2,290 ft. to 2,550 ft. were selected southwest in the upwind direction of the Facility. Parcels ranging from 1,050 ft. to 1,800 ft. were chosen northeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. A single elevated lead concentration was found in the downwind direction of the Facility and low-level lead concentrations were found in the upwind direction. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus, the Phase I investigation was designed to determine if an off-site airborne release had occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind envelope.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the Facility by graphing the data in relation to each other. Evaluation of this graph (see **Attachment E**) indicated consistently low concentrations of lead in the upwind direction and slightly elevated levels of lead in the downwind direction. The graph does not represent decreasing concentrations with increasing distance from the Facility, a condition that would be expected if

an aerial release of lead had occurred due to smelting operations. These conclusions were confirmed by a linear regression of the concentrations versus distance data (**Attachment E**).

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind logmean is 5.1 mg/kg and the upwind logmean is 4.3 mg/kg indicating the concentrations downwind are greater than the upwind concentrations. In addition the relative frequency histogram (**Attachment F**) for the upwind data shows a larger variation across a smaller concentrations range than the downwind. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data represent separate conditions.

4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility does not suggest that lead contamination detected in downwind locations is attributable to historic releases from historic smelting operations at the Facility. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U.S. EPA 1994, as amended.

Samples collected from upwind of the Facility did not contain concentrations of lead above the screening level and the lead that is present is similar in concentration to that found in the far downwind direction, which could be indicative of background concentration. Additionally, the downwind samples do not show a trend of decreasing concentration with increasing distance. The data collected during the Phase I sampling did not suggest that an aerial release occurred from the site during historic smelting operations.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

The results of this investigation do not indicate that downwind soils at properties have been impacted by releases of lead from the Facility as a result of aerial deposition related to historic smelting operations. However, one sample in the downwind deposition area is greater than the screening level it is recommended that additional soil samples be collected from additional properties located within 1500 feet downwind of the Facility.

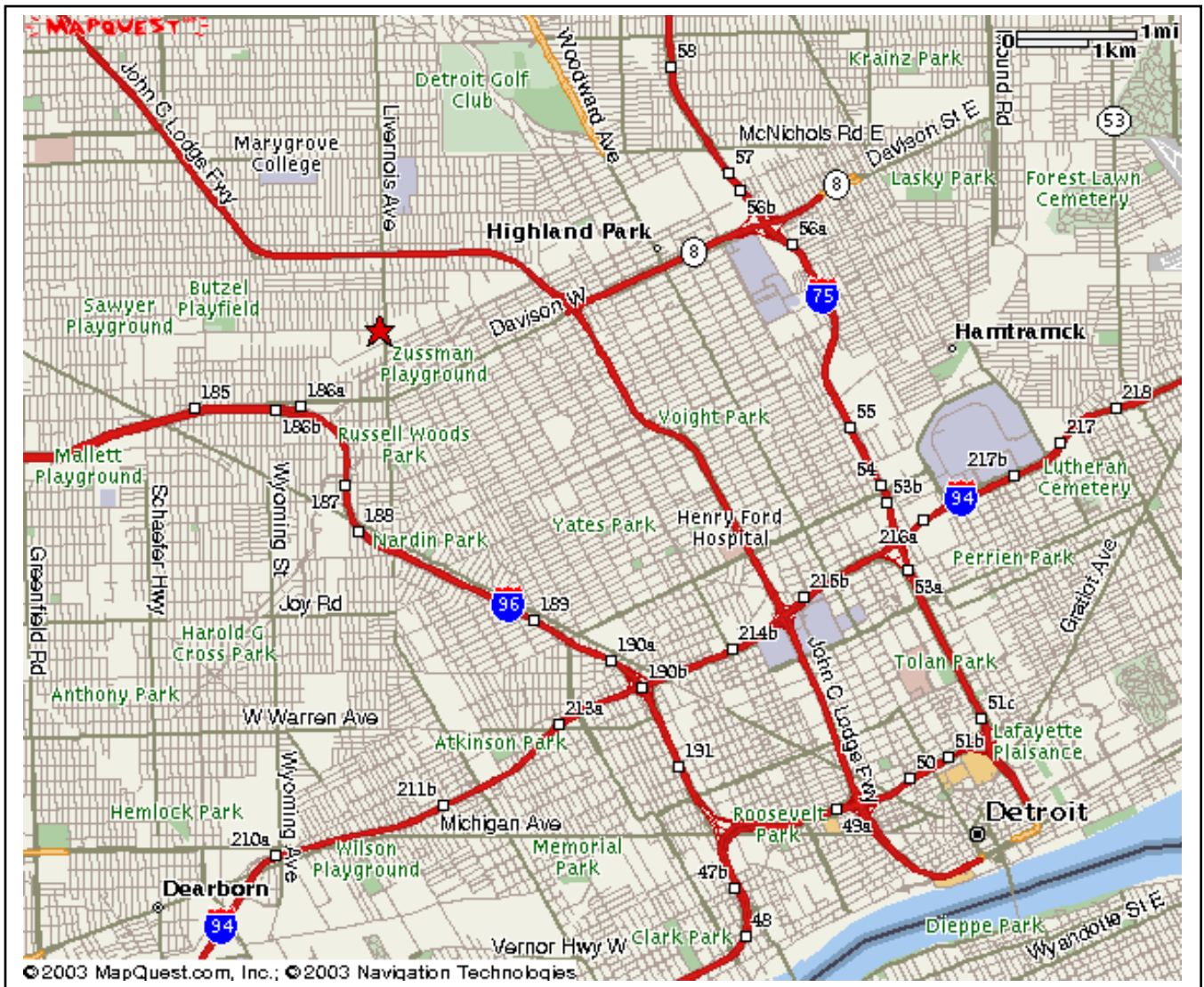
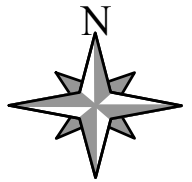
If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning):
- Interview past employees regarding historical Site operations;
- Perform a Site walk to determine existing conditions; and
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
7001 Lyndon Street

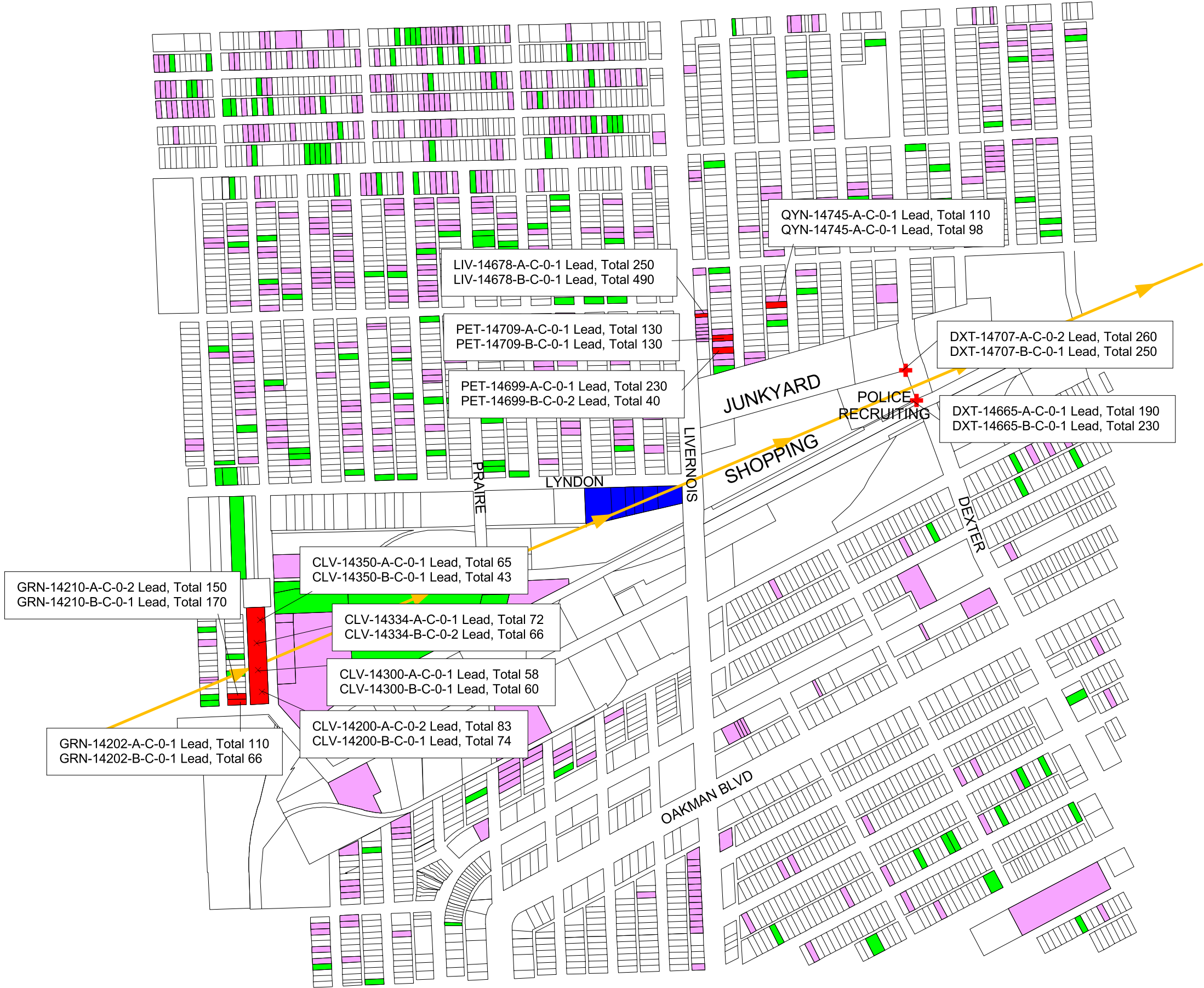


WESTON SOLUTIONS, INC. OF MICHIGAN



300 River Place, Suite 2800
Detroit, Michigan 48207

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001



LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

Sampled Properties (Greenway)

Parcel Boundaries

Sampled Properties

Facility of Concern

State Owned Property

City Owned Property

Wind Direction

Note: All Lead, Total analytical results are shown in mg/kg.

N

0 600 Feet

WESTON
SOLUTIONSSM

PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Soultions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Detroit Lead Pipe Works
7001 Lyndon Street

WORK ORDER No.:	20083.028.001	PROJECT MANAGER:	
DRAWN BY:	JLT	CHECKED BY:	
DRAWING NAME:		DIRECTORY/ FOLDER:	JLT://D:\DLAP\apr\09_09_03_apr
CONTRACT No.:		DELIVERY ORDER No.:	
SCALE:		REPORT DATE:	
DATE:	January 2004	REVISION No.:	
		FIGURE No.:	2

CLIENT/SUBJECT LYNDON W.O. NO. _____

TASK DESCRIPTION CLV- 14350AB ; 14334 A+B ; 14300AB ; TASK NO. 14300 AB

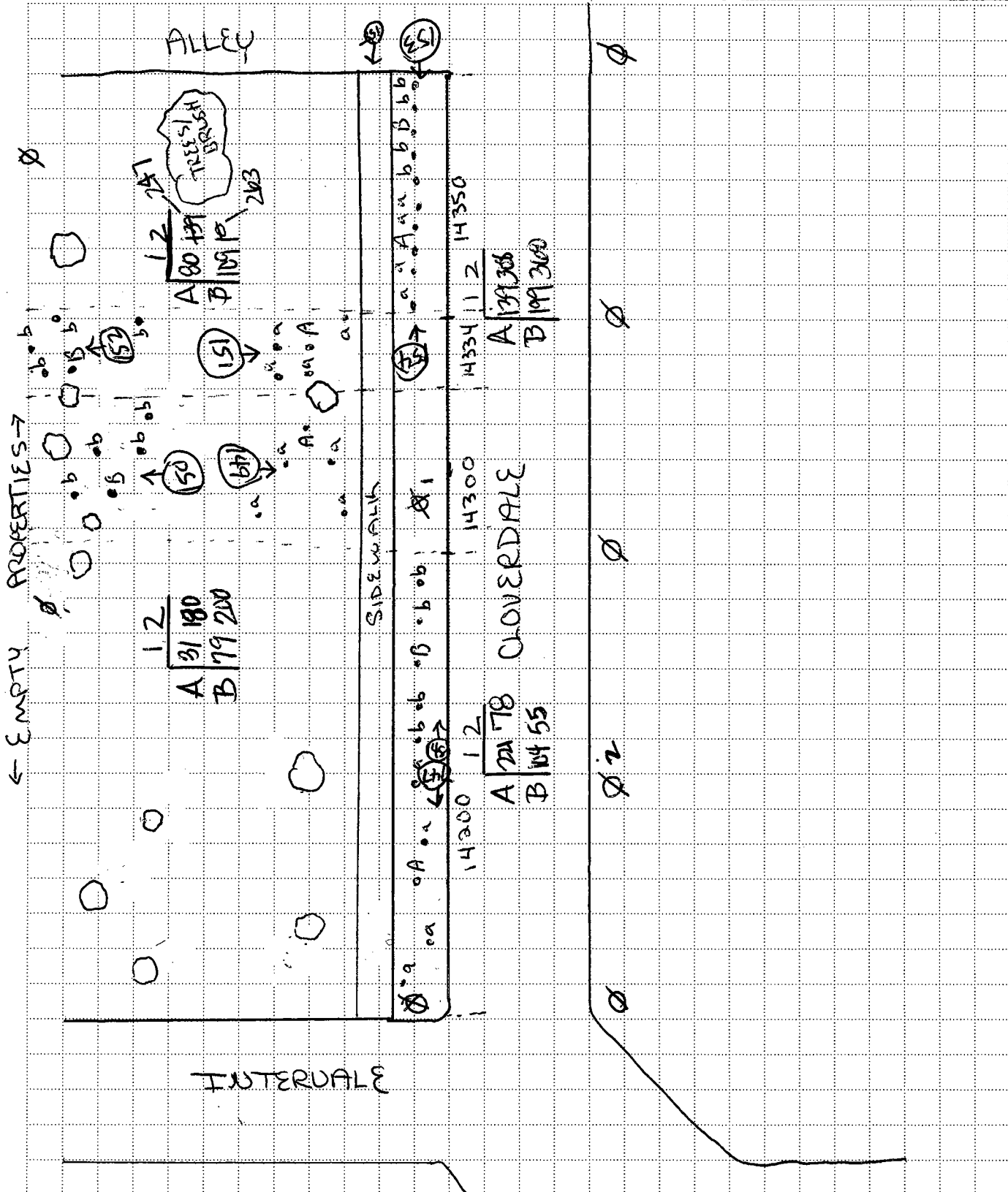
PREPARED BY A. Freeman DEPT _____ DATE 12/4/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____

DEPT _____ DATE _____



CLIENT/SUBJECT Lyndon W.O. NO. _____

TASK DESCRIPTION 14202 + 14210 Greenlawn A+B TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

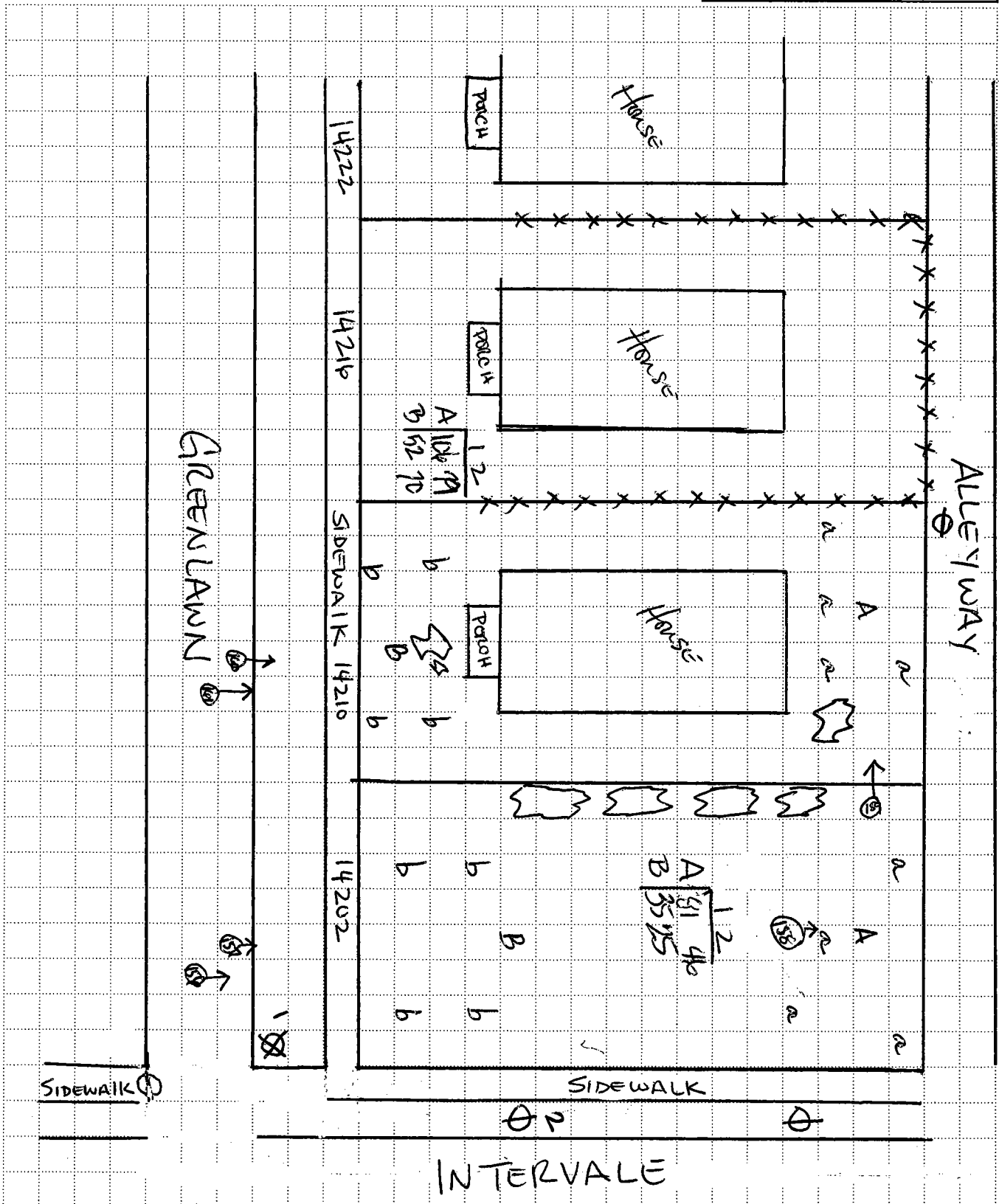
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METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	

DEPT _____	DATE _____

NP



CLIENT/SUBJECT LYNDON W.O. NO. _____

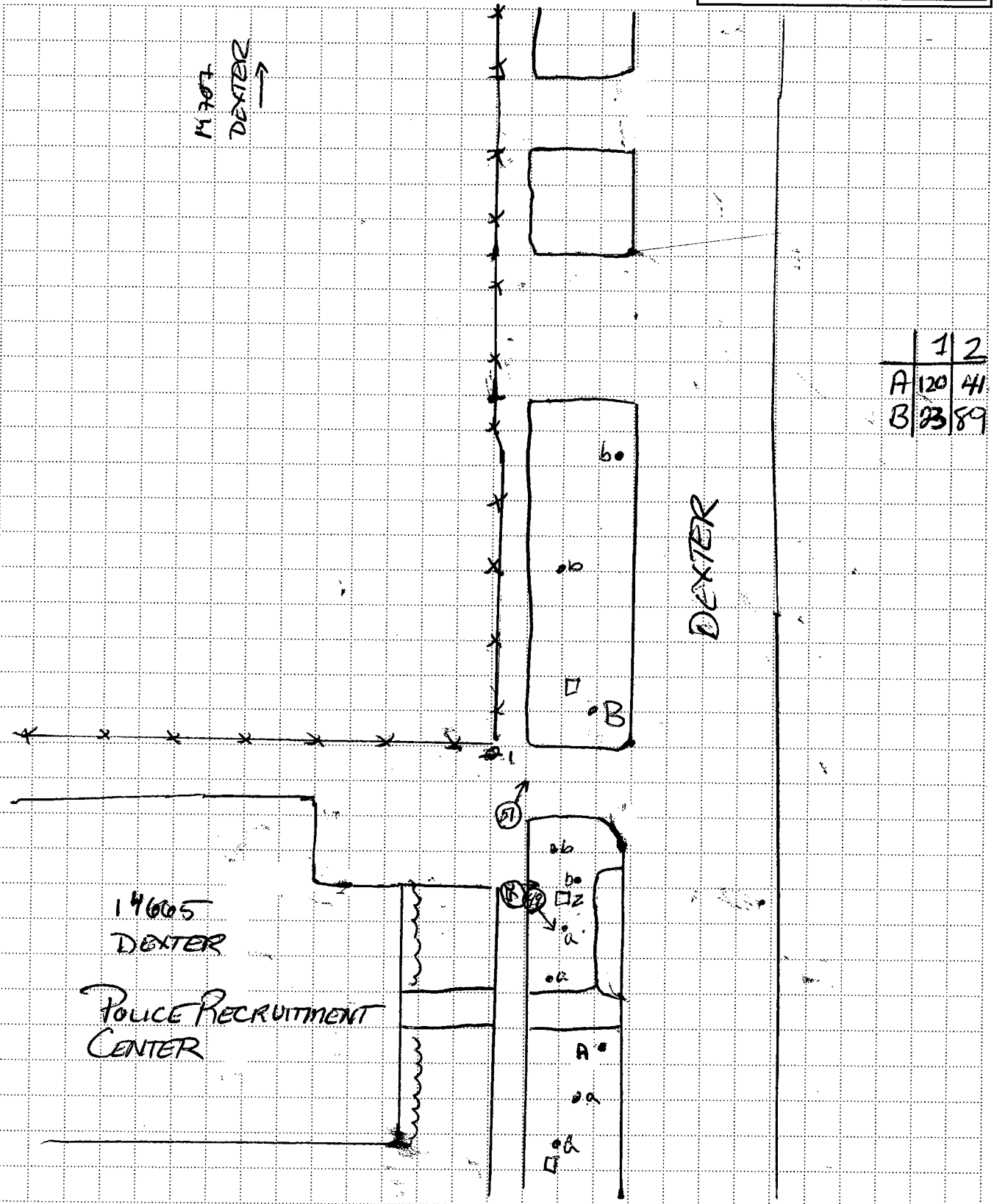
TASK DESCRIPTION DXT-14665 A+B TASK NO. _____

PREPARED BY R. Nemirawski DEPT _____ DATE 11/13/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT LYNDON

W.O. NO. _____

TASK DESCRIPTION 146005 AND 14707 DEXTER A+B

TASK NO. _____

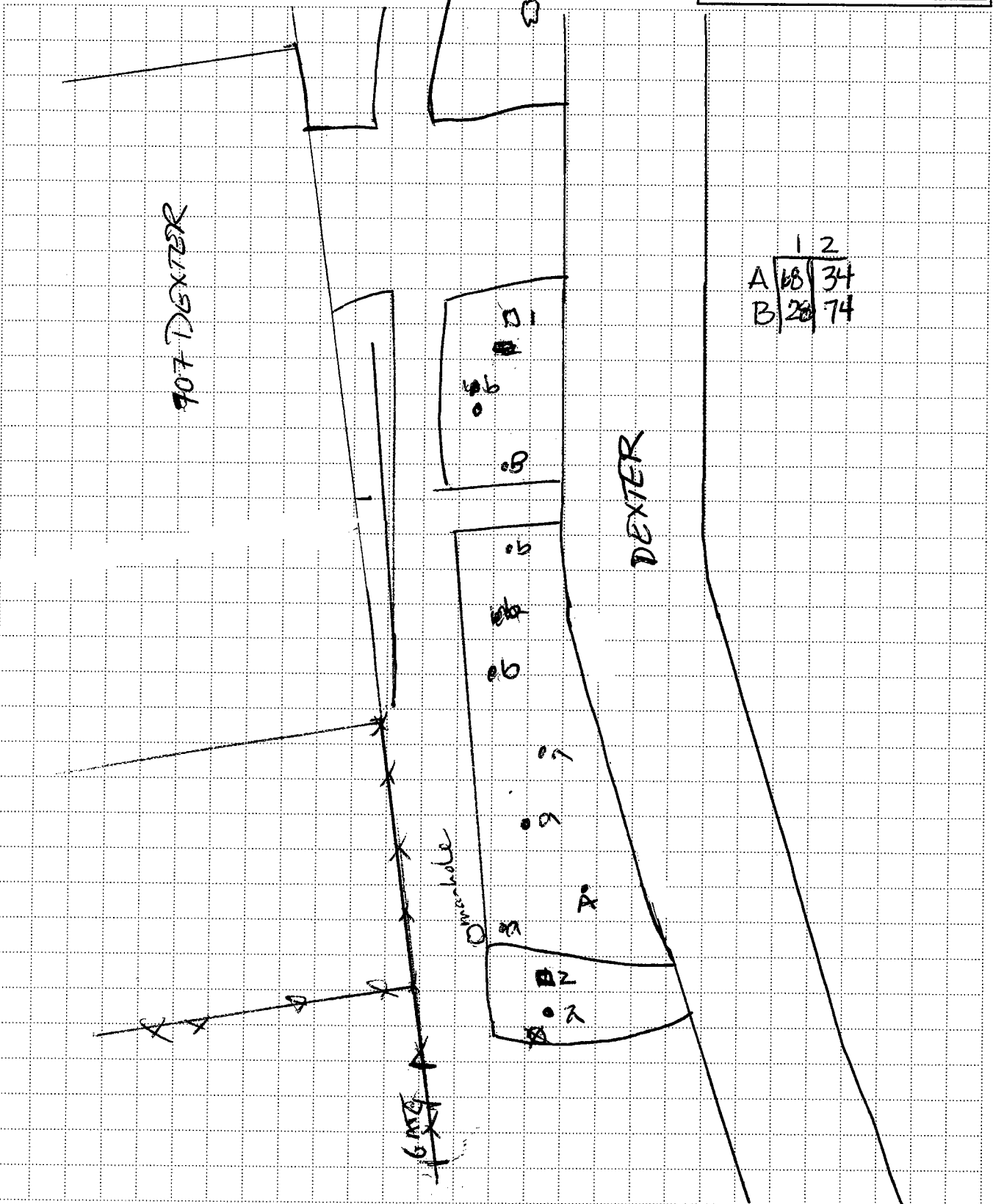
PREPARED BY R. NEMIROVSEY DEPT _____ DATE 11/13/03

APPROVED BY

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

DEPT _____ DATE _____



CLIENT/SUBJECT LYNDON W.O. NO. _____

TASK DESCRIPTION QNY-14745-A+B TASK NO. _____

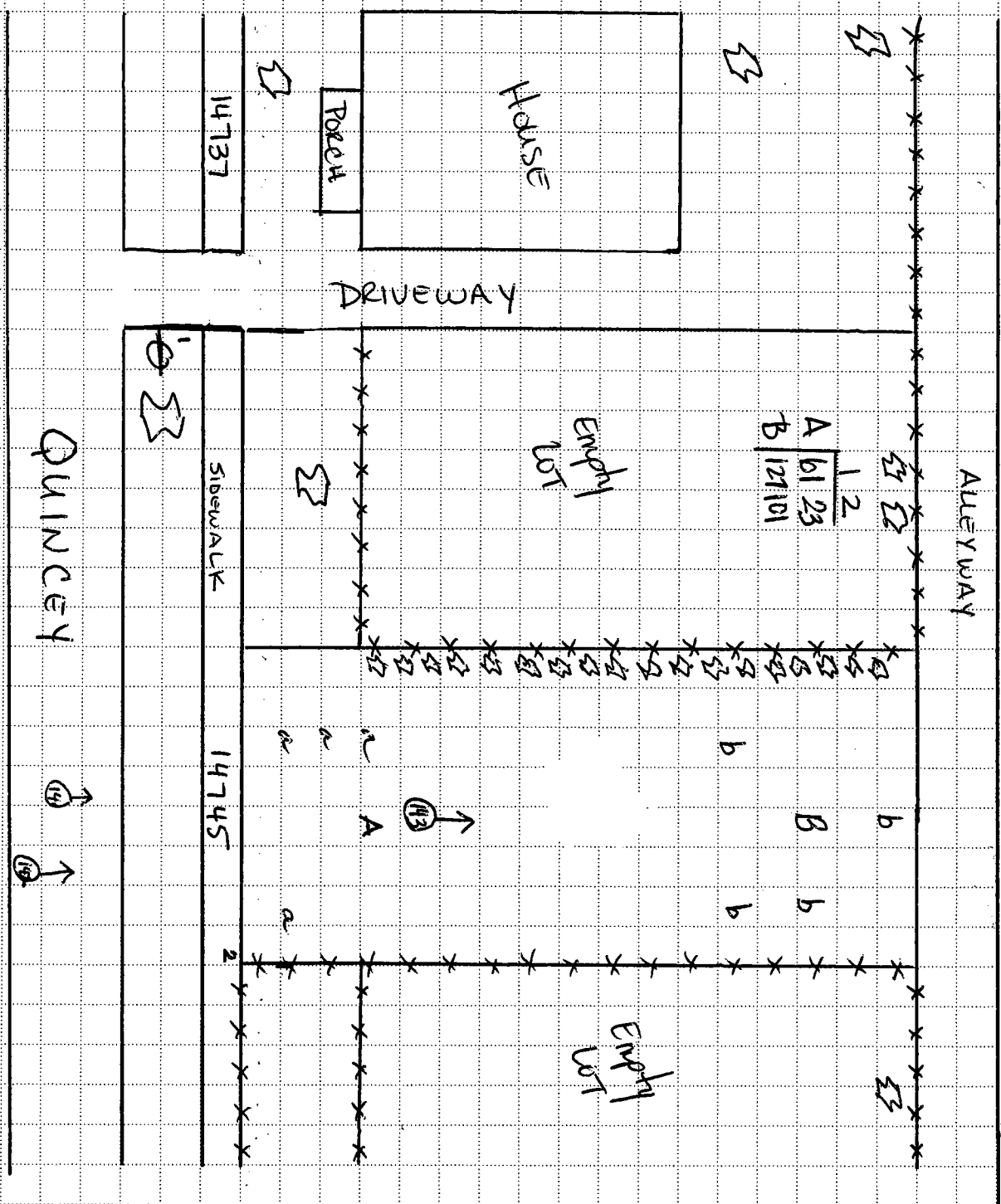
PREPARED BY S. LEWIS DEPT _____ DATE 12/4/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
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DEPT _____	DATE _____

N



CLIENT/SUBJECT LONDON W.O. NO. _____

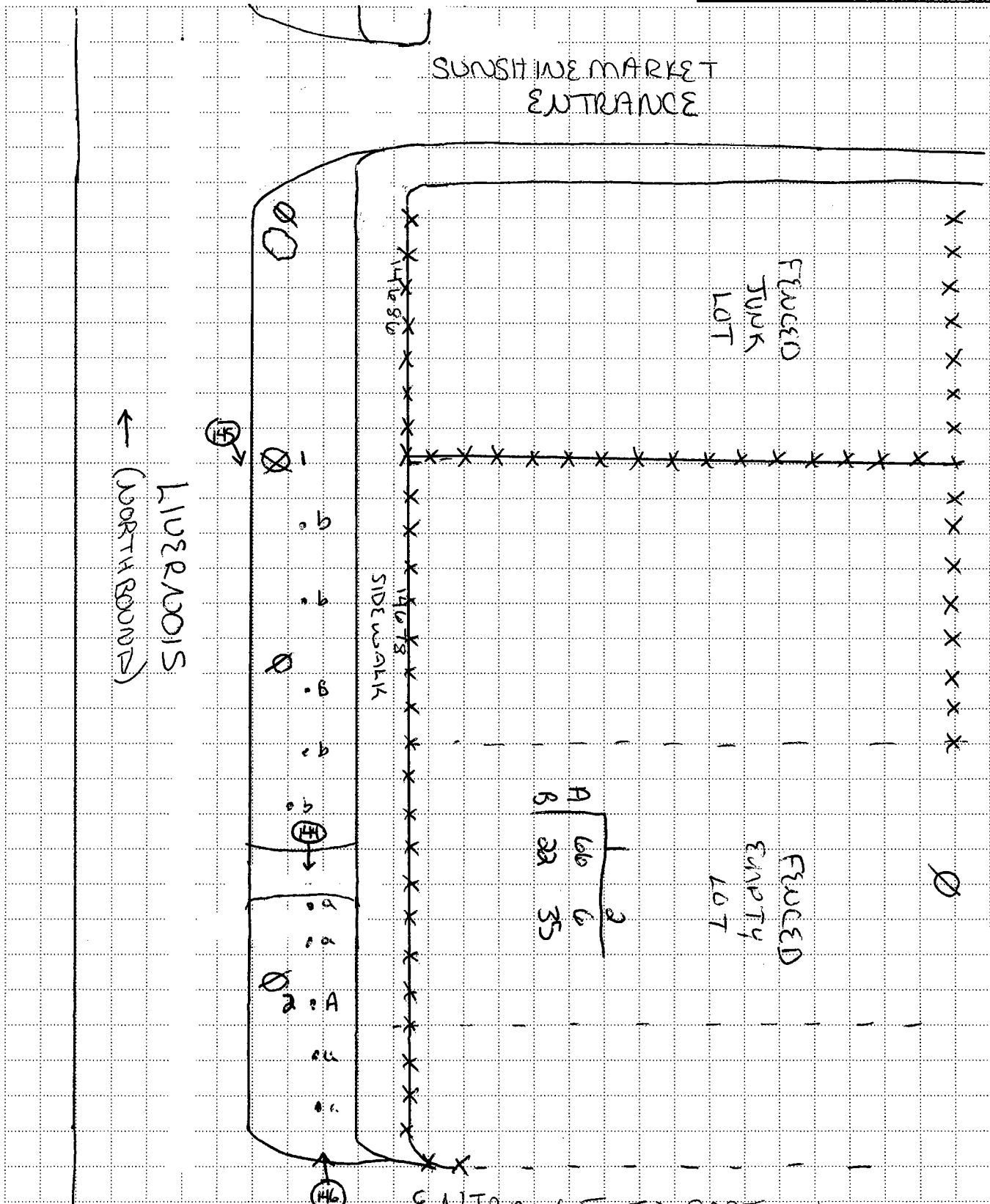
TASK DESCRIPTION LIV- 14678 A+B TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 12/4/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
14205 Cloverdale*	Vacant property on the west side of Cloverdale St. Greenway used on corner of Cloverdale and Intervale.	CLV-14200-A-C-0-2
		CLV-14200-B-C-0-1
14205 Cloverdale*	Vacant property on the west side of Cloverdale St. Lot used.	CLV-14300-A-C-0-1
		CLV-14300-B-C-0-1
14205 Cloverdale*	Vacant property on the west side of Cloverdale St. Lot used.	CLV-14334-A-C-0-1
		CLV-14334-B-C-0-2
14205 Cloverdale*	Vacant property on the west side of Cloverdale St. Greenway used on corner of Cloverdale and an alley.	CLV-14350-A-C-0-1
		CLV-14350-B-C-0-1
14202 Greenlawn	Vacant property on the east side of Greenlawn St at the Corner of Greenlawn and Intervale.	GRN-14202-A-C-0-1
		GRN-14202-B-C-0-1
14210 Greenlawn	House located on the east side of Greenlawn St. Front and Back yard used for sampling.	GRN-14210-A-C-0-2
		GRN-14210-B-C-0-1
Downwind Properties		
Address	Description	Sample Identification
14665 Dexter	Greenway located on the west side of Dexter St and to the east of a Police Recruitment Center.	DXT-14665-A-C-0-1
		DXT-14665-B-C-0-1
14707 Dexter	Greenway located on the west side of Dexter St and to the east of a fenced in lot.	DXT-14707-A-C-0-2
		DXT-14707-B-C-0-1
14699 Petosky	Vacant property located on the east side of Petosky St and the fourth vacant lot to the north of a house at 14723 Petosky.	PET-14699-A-C-0-1
		PET-14699-B-C-0-2
14709 Petosky	Vacant property located on the east side of Petosky St and the second vacant lot to the north of a house at 14723 Petosky.	PET-14709-A-C-0-1
		PET-14709-B-C-0-1
14745 Quincey	Vacant property located on the west side of Quincey St and between two fenced vacant lots.	QYN-14745-A-C-0-1
		QYN-14745-A-C-0-1
14678 Livernois	Greenway located on the east side of Livernois St and to the west of fenced in lot containing Captain Hooks Used Auto Parts Building.	LIV-14678-A-C-0-1
		LIV-14678-B-C-0-1

*Notes:

1) Actual address of property sampled.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
14205 Cloverdale	CLV-14200-A-C-0-2	83
14205 Cloverdale	CLV-14200-B-C-0-1	74
14205 Cloverdale	CLV-14300-A-C-0-1	58
14205 Cloverdale	CLV-14300-B-C-0-1	60
14205 Cloverdale	CLV-14334-A-C-0-1	72
14205 Cloverdale	CLV-14334-B-C-0-2	66
14205 Cloverdale	CLV-14350-A-C-0-1	65
14205 Cloverdale	CLV-14350-B-C-0-1	43
14202 Greenlawn	GRN-14202-A-C-0-1	110
14202 Greenlawn	GRN-14202-B-C-0-1	66
14210 Greenlawn	GRN-14210-A-C-0-2	150
14210 Greenlawn	GRN-14210-B-C-0-1	170
Downwind		
14665 Dexter	DXT-14665-A-C-0-1	190
14665 Dexter	DXT-14665-B-C-0-1	230
14707 Dexter	DXT-14707-A-C-0-2	260
14707 Dexter	DXT-14707-B-C-0-1	250
14699 Petosky	PET-14699-A-C-0-1	230
14699 Petosky	PET-14699-B-C-0-2	40
14709 Petosky	PET-14709-A-C-0-1	130
14709 Petosky	PET-14709-B-C-0-1	130
14745 Quincey	QYN-14745-A-C-0-1	110
14745 Quincey	QYN-14745-A-C-0-1	98
14678 Livernois	LIV-14678-A-C-0-1	250
14678 Livernois	LIV-14678-B-C-0-1	490

*Notes

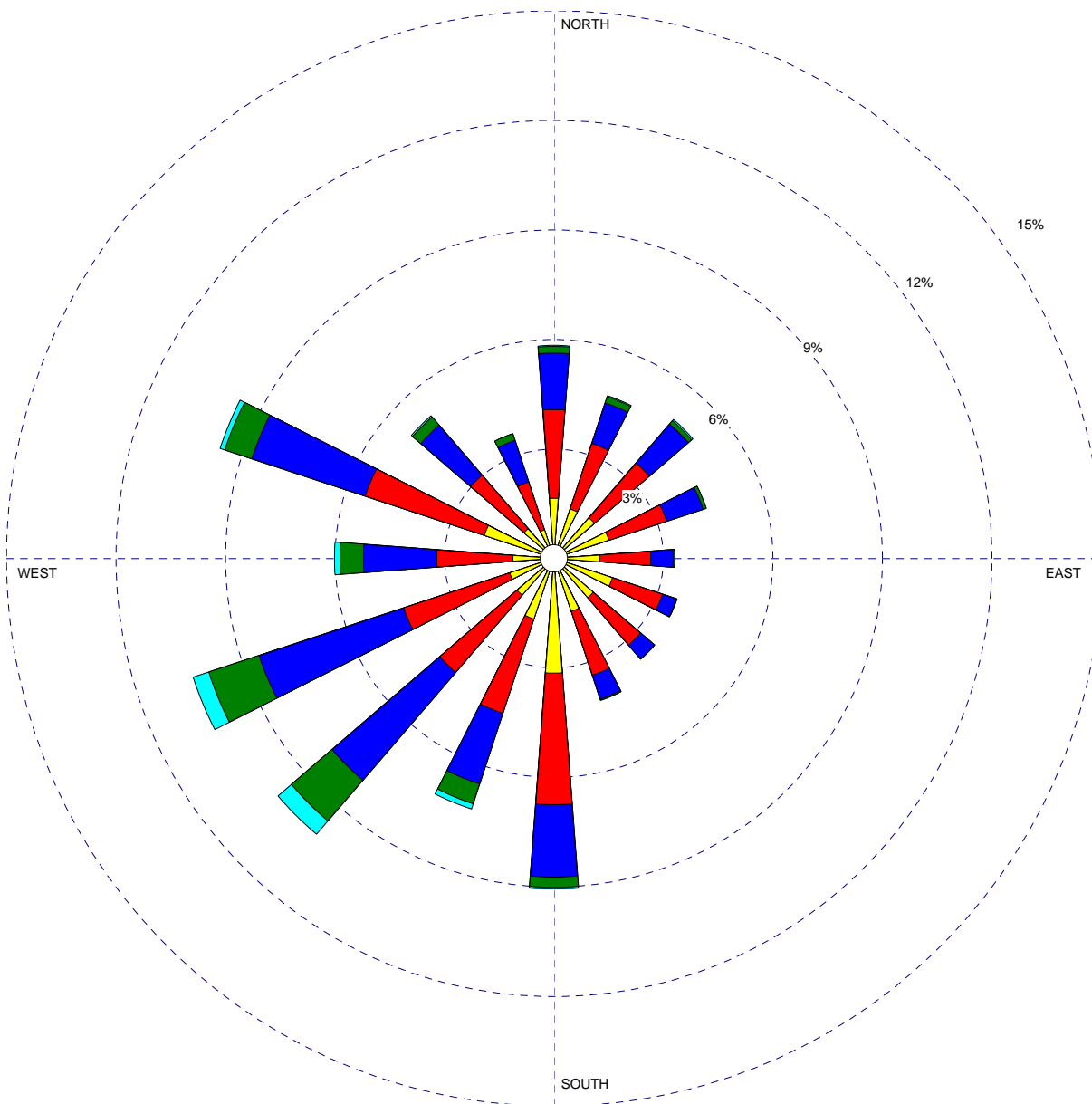
1) Bold indicates results equal to or greater than to 400 mg/kg.

ATTACHMENT C

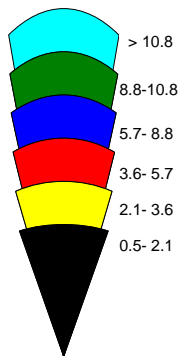
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

Former Detroit Lead Pipe Works – 7001 Lyndon

14200 Cloverdale – Vacant property located on the west side of Cloverdale St. The greenway was used on the corner of Cloverdale and Intervale.

Looking south along the greenway at 5 discrete sample A locations.



Looking north along the greenway at 5 discrete sample B locations.



Lyndon (cont'd)

14300 Cloverdale – Vacant property located on the west side of Cloverdale. Lot used.

Looking east along the vacant property at 5 discrete sample A locations.



Looking west along the vacant property at 5 discrete sample B locations.



Lyndon (cont'd)

14334 Cloverdale – Vacant property located on the west side of Cloverdale St and directly north of the vacant property at 14300 Cloverdale.

Looking east along the vacant property at 5 discrete sample A locations.



Sample B locations are located to the west of the sample A locations. Photo file was corrupt.

Lyndon (cont'd)

14350 Cloverdale – Vacant property located on the west side of Cloverdale St. Greenway used on the Corner of Cloverdale and an alley.

Looking south along the greenway at 5 discrete sample A locations.



Looking north along the greenway at 5 discrete sample B locations.



Looking south along the property of the total sampling area; including 14200, 14300, 14334, and 14350 Cloverdale.



Lyndon (cont'd)

14202 Greenlawn – Vacant property located on the east side of Greenlawn St and at the corner of Greenlawn and Intervale St.

Looking east along the vacant property at 5 discrete sample A locations.



Looking east along the vacant property at 5 discrete sample B locations. The total sampling area can be viewed in this photo.



Lyndon (cont'd)

14210 Greenlawn – House located on the east side of Greenlawn St. The front and the back yard were used for sampling.

Looking north along the back of the property at 5 discrete sample A locations.



Looking east along the front of the property at 5 discrete sample B locations.



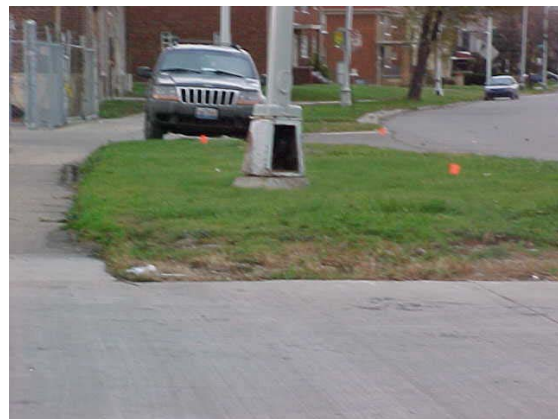
Lyndon (cont'd)

14665 Dexter – Greenway located on the west side of Dexter ST and to the east of a Police Recruitment Center.

Looking southeast along the greenway at 5 discrete sample A locations.



Looking east and northeast, respectively, along the greenway at 5 total discrete sample B locations.



Lyndon (cont'd)

14707 Dexter – Greenway located on the west side of Dexter St and to the east of a fenced in lot.

Looking north along the greenway at 10 total discrete sample A and B locations, respectively.



Lyndon (cont'd)

14699 Petosky – Vacant property located on the east side of Petosky St and it is the fourth vacant lot to the north of a house at 14723 Petosky.

Looking northeast along the vacant property at 5 discrete sample A locations.



Looking north along the vacant property at 5 total discrete sample B locations.



Lyndon (cont'd)

14709 Petosky – Vacant property located on the east side of Petosky St and it is the second vacant lot to the north of a house at 14723 Petosky.

Looking northeast along the vacant property at 5 discrete sample A locations.



Looking southwest and west, respectively, along the vacant property at 5 total discrete sample B locations.



Lyndon (cont'd)

14745 Quincey – Vacant property located on the west side of Quincey St and between two fenced vacant lots.

Looking west along the vacant property at 5 discrete sample A locations. The total sampling area can be viewed in this photo.



Looking west along the vacant property at 5 discrete sample B locations.



Lyndon (cont'd)

14678 Livernois – Greenway located on the east side of Livernois St and to the west of a fenced in lot containing Captain Hooks Used Auto Parts Building.

Looking south along the greenway at 5 discrete sample A locations.



Looking southeast along the greenway at 5 discrete sample B locations. Sample A locations can be seen further to the southeast.

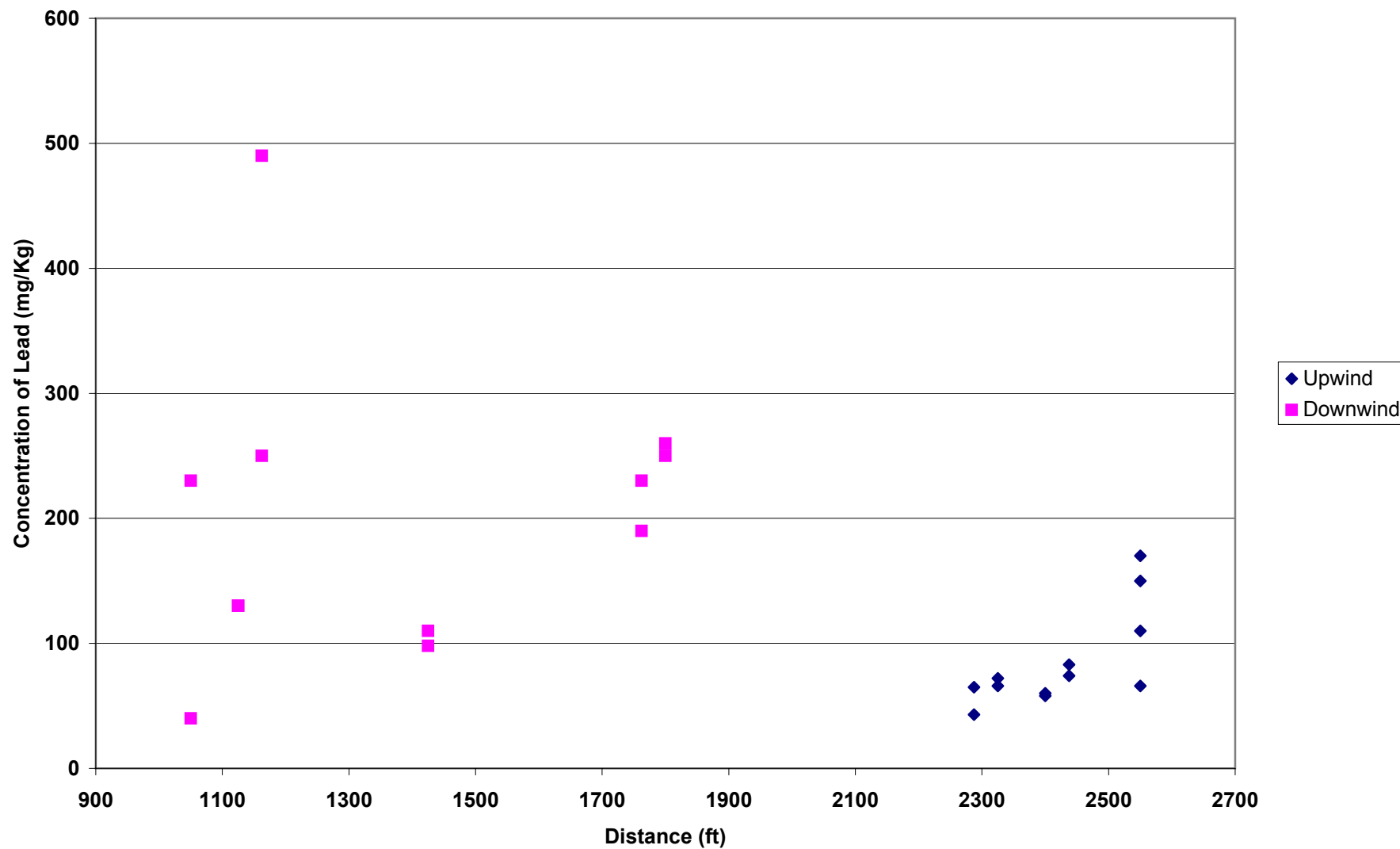


Looking north along the greenway at the total sampling area.



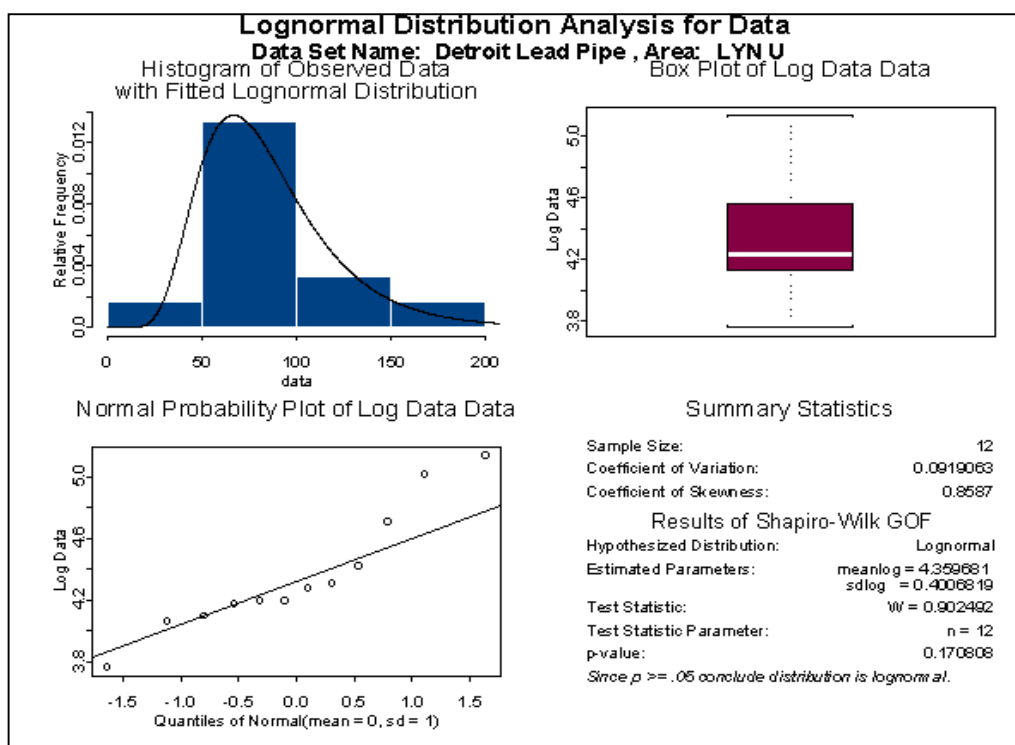
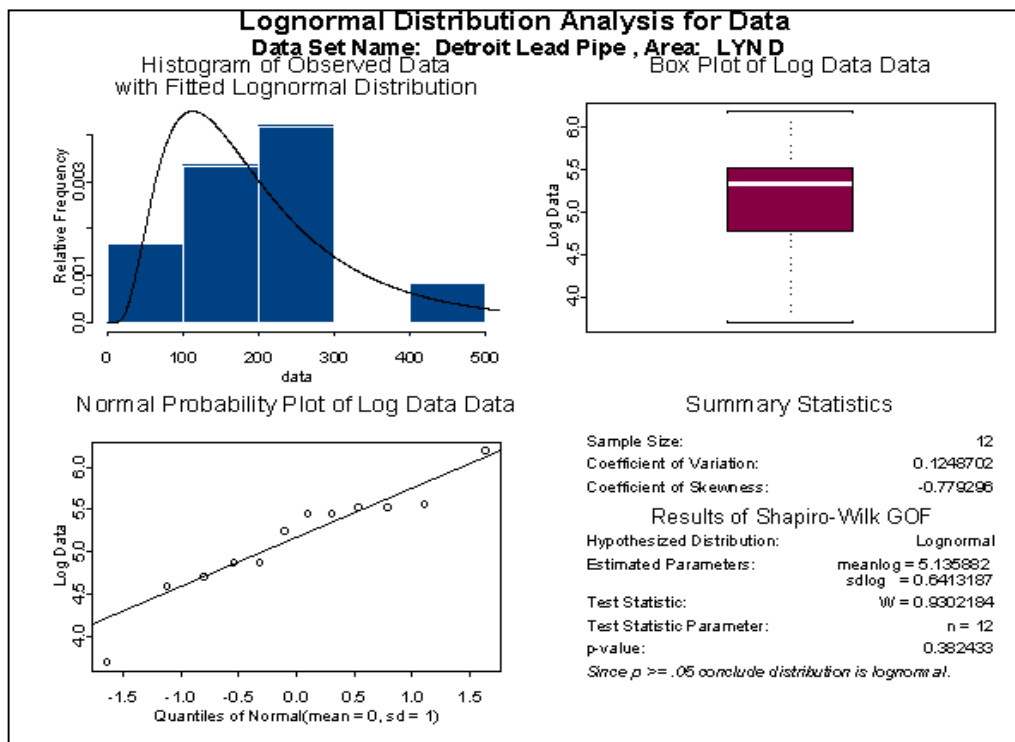
ATTACHMENT E
CONCENTRATION GRAPH

7001 Lyndon



ATTACHMENT F
STATISTICAL DISTRIBUTION

DETROIT LEAD PIPE WORKS STATISTICAL DISTRIBUTION



Appendix H

Wolverine White Metal Phase I Summary Report

DRAFT

**PHASE I SAMPLING REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
WOLVERINE WHITE METAL – 3421 GIBSON STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDiation AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place

Suite 2-300

3058 West Grand Boulevard

Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.

2501 Jolly Road

Suite 100

Okemos, Michigan 48864

February 2004

W.O. No.: 20083.028.001

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Wolverine White Metal (the Facility), 3421 Gibson Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at the adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 19 and 20 November 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from the Facility during historic smelting operations. However, a large gap exists in the downwind deposition area due to the availability of City and/or State owned so it is recommended that additional soil samples be collected from additional properties located within 1500 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical Site operations;
- Perform a Site walk to determine existing conditions; and
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

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LIST OF ATTACHMENTS

Title

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Attachment B	Tables
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Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to perform off-site sampling activities for the Detroit Lead Assessment Project in Detroit, Wayne County, Michigan. This report addresses work that was conducted in the vicinity of the former Wolverine White Metal Company (the Facility), 3421 Gibson Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report* for the Detroit Lead Assessment Project (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Summary Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E** – Concentration Graph, and
- **Attachment F** – Statistical Distribution.

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 3421 Gibson Street in Detroit, Wayne County, Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "*Summary Report for Data Investigation, Detroit Lead Assessment Project*" dated September 2003, concluded that the facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility was located at 3421 Gibson Street in Detroit, Wayne County, Michigan (Detroit Metropolitan Area). The Facility appears to be a fenced vacant lot. Pallets of bricks are being stored inside the fence and the areas were likely used as a parking lot. The area five blocks north of the Facility is residential. The areas five blocks south, east, and west of the Facility are both industrial and commercial with residences starting at the five-block fringe.

2.1.2 Site History

Review of the Bresser's city directory indicated that Wolverine White Metal owned the property from 1946 to 1971. There are no listings for the address from 1971 to the present.

Review of the Sanborn maps for this address showed the following chronology: 1921 Wolverine White Metal Company present with warehouse and solder room; 1986 through 2002 Wolverine White Metal Company no longer present.

The aerial photograph review showed that this address was located in an industrial area. The 1957 photograph showed a stack located across the street from the property. The property is currently vacant but the immediate surrounding area is still industrialized with residential use within 300 ft. to the north and west, and up to 1,500 ft. to the east. Structures were not identified from the most recent aerial photograph (2003 GlobeXplorer™) and the property exists as a vacant lot situated between Gibson and Lincoln Streets. Review of the drive by information indicates that land use is consistent with the aerial photograph and sanborn maps.

During the investigation of the fire records, a permit indicating the replacement of a defective stack in the Blk. Factory (Smelting White Metal) was located.

Review of the BEA for nearby Sites “69 through 73 Selden, 141 Selden, and 3752 Cass”, dated December 1996, prepared by Soil and Materials Engineers Inc. for Detroit Symphony Orchestra Hall, indicates that lead was detected on the Sites at levels up to 890 mg/kg and exceeded the MDEQ Part 201 Residential Direct Contact Criterion (RDCC).

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations with smelter-related releases were present off-site and could be attributed to the former Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for this property.

Prior to sample collection, upwind and downwind sampling areas were established, 1,300 and 1,600 feet (ft.) from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or state owned properties located within these established areas.

The City and/or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual City or State owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, and photo documentation) were conducted as described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project*. Because no State or City owned parcels were available in the sample radius for the Facility, WESTON collected samples from 12 City and/or State owned parcels near the Facility. Six parcels were sampled in the downwind direction and six parcels were sampled in the upwind direction. Two composite samples were collected from each of the six

downwind and upwind parcels. A total of 24 composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**. WESTON field personnel or a common carrier, typically every other day. Soil sample preservatives were not required, but rinsate blank samples were preserved on ice.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky and Ms. Amanda Freeman, conducted field sampling on 19 and 20 November 2003. When city and /or state owned parcels were not located on the same street as the mailing address of the nearest building, the number of the building was used in conjunction with the street of the greenway. For example, an apartment located at an apartment complex under the tax address of 2921 Fourth Street with an adjoining grassy area located in front of apartment number 939, would be identified as FRT – 00939. These changes were noted in the logbook and can be viewed in the “Summary Table For Sample Properties” (located in **Attachment B**) and on the sample sketches (located in **Attachment A**). WESTON collected two composite samples from each of the six upwind city and/or state owned parcels. Also, two composite samples were taken from each of the six downwind city and/or state owned parcels. Twenty-four soil samples were submitted for analysis. Five samples were designated as a matrix spike/matrix spike duplicates (MS/MSD) in accordance with QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- 12 composite soil samples in the downwind direction.

Sample locations from both the upwind and downwind areas are listed in **Table 1** included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. Five samples collected from properties upwind of the former facility contained concentrations of lead above the project screening level (400 milligrams per kilograms [mg/kg]) established in the Phase I QASP. Samples collected from properties downwind of the former Facility did not contain concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	5	120-860
Downwind	12	0	41-240
Total	24	5	41-860

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were selected based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the city of Detroit Metropolitan Area. If smelting operations occurred, lead in

soils resulting from aerial deposition would be found downwind in the northeast direction from the Facility. Parcels ranging from 650 ft. to 1,350 ft. were chosen southwest in the upwind direction of the Facility. Parcels ranging from 440 ft. to 1,530 ft. were chosen northeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. Elevated lead concentrations were found in the upwind direction of the Facility and low-level lead concentrations were found in the downwind direction. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus the Phase I investigation was designed to determine if an off-site airborne release had occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary upwind envelope but not in the downwind.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated elevated levels of lead occurred in the upwind direction but not in the downwind direction from the facility. The downwind direction showed consistently low concentrations (all less than the screening level) of lead with no clear change in concentration versus increasing distance from the facility. These conclusions were confirmed by a linear regression of the concentrations versus distance data (**Attachment E**).

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind logmean is 4.8 mg/kg and the upwind logmean is 5.7 mg/kg indicating the concentrations upwind are greater than the downwind concentrations. In addition, the relative frequency histograms (**Attachment F**) show the upwind concentrations are spread over a greater range (up to 1000mg/kg) than the downwind. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data represent separate conditions.

4.5 CONCLUSIONS

The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U.S. EPA Act 1994, as amended.

Samples collected from downwind of the Facility did not contain concentrations of lead above the screening level. The upwind samples contain elevated lead concentrations, but this condition is not indicative of aerial deposition. The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from the Facility during historic smelting operations.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

The results of this investigation do not indicate that downwind soils at properties have been impacted by releases of lead from the Facility as a result of aerial deposition related to historic smelting operations. However, a large data gap exists in the downwind deposition area due to the availability of City and/or State owned so it is recommended that additional soil samples be collected from additional properties located within 1500 feet downwind of the Facility.

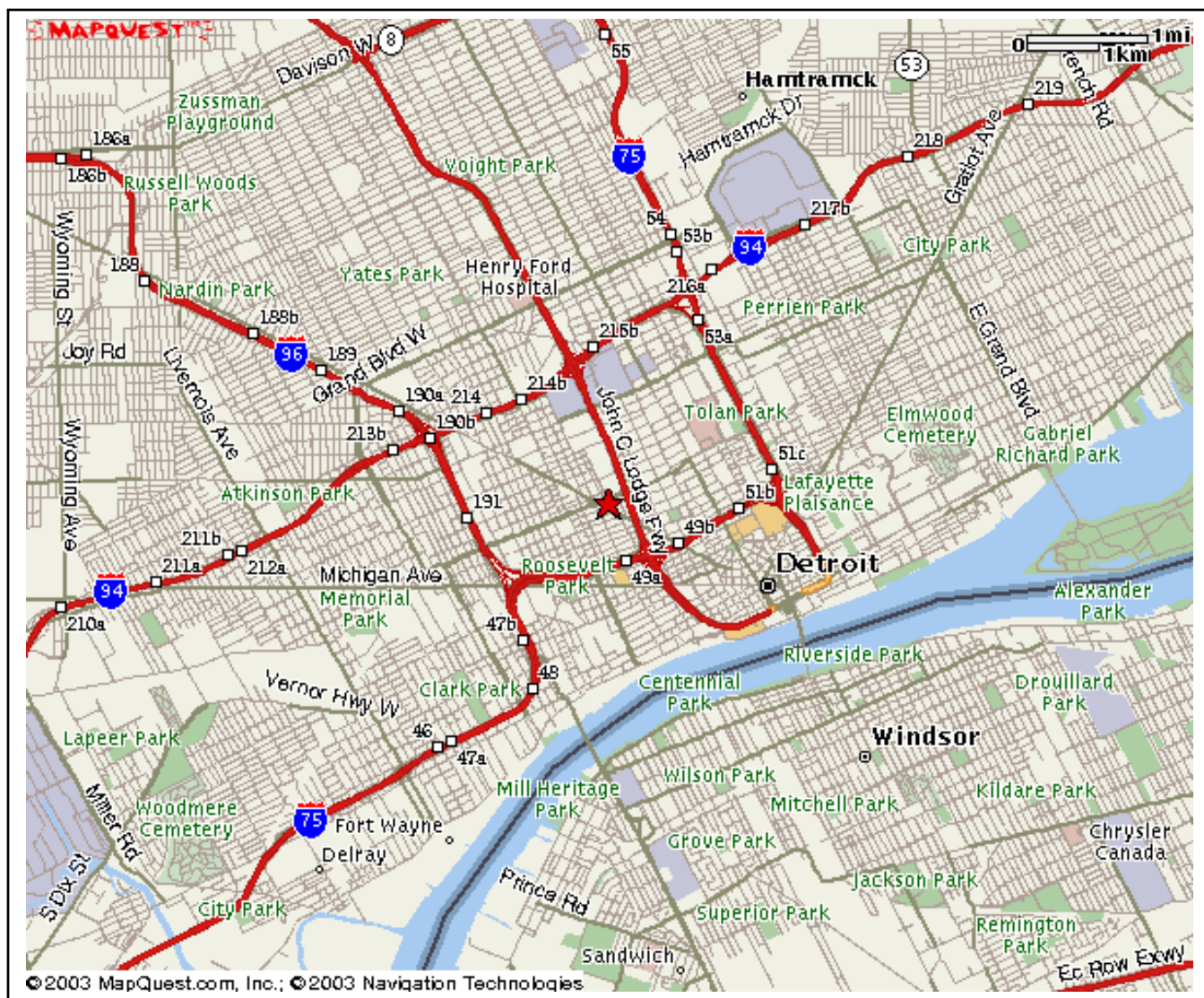
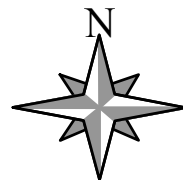
If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning):
- Interview past employees regarding historical Site operations;
- Perform a Site walk to determine existing conditions; and
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
3421 Gibson Street

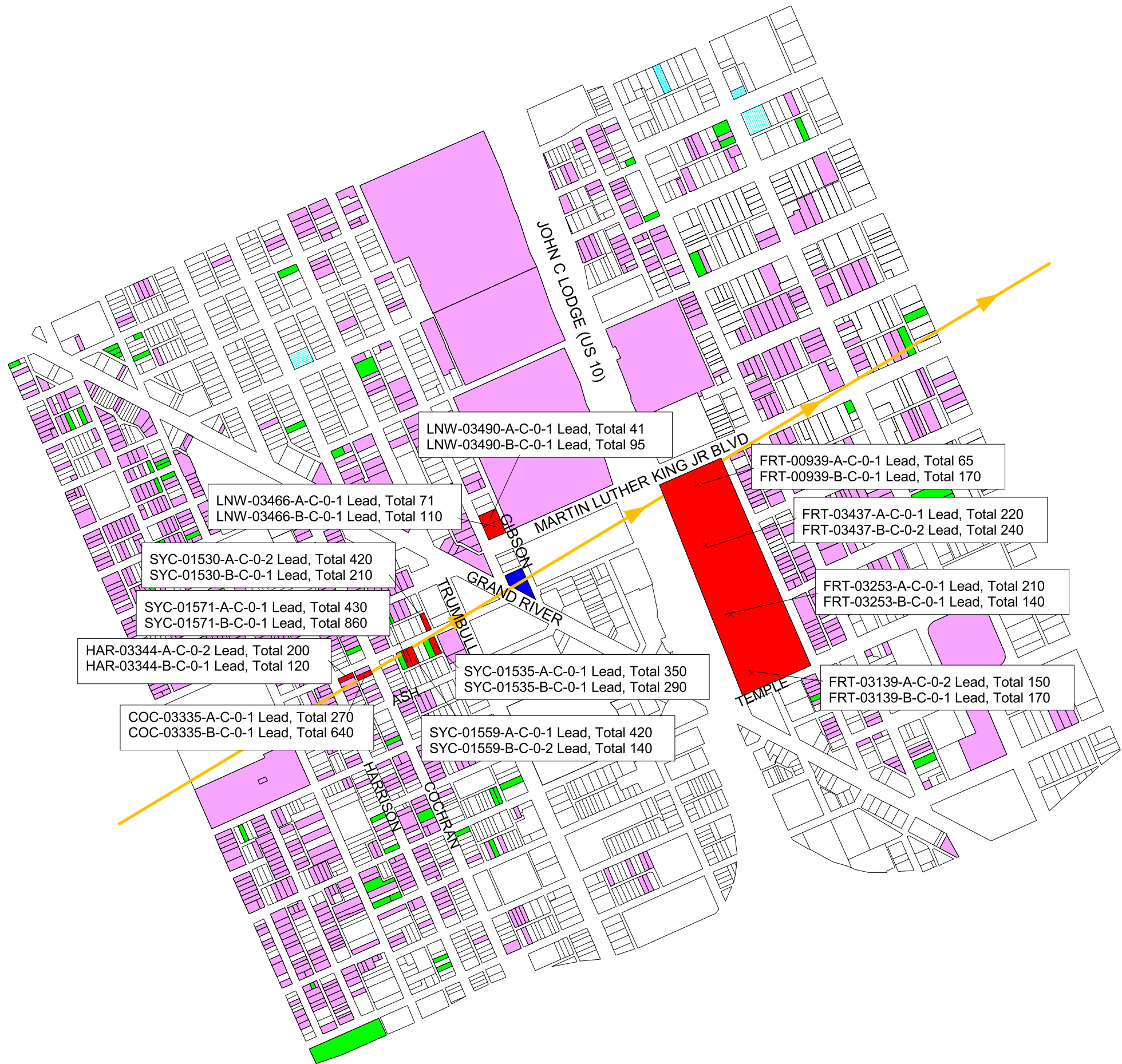


WESTON SOLUTIONS, INC. OF MICHIGAN



300 River Place, Suite 2800
Detroit, Michigan 48207

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001



LEGEND:

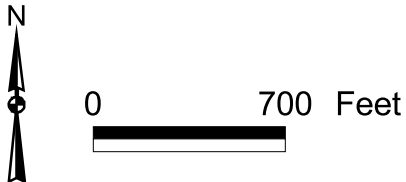
EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

- Parcel Boundaries
- Sampled Properties
- Facility of Concern
- State Owned Property
- City Owned Property
- Wind Direction

Note: All Lead, Total analytical results are shown in mg/kg.



PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Wolverine White Metal
3421 Gibson Street

WORK ORDER No.: 20083.028.001	PROJECT MANAGER:	
DRAWN BY: JLT	CHECKED BY:	
DRAWING NAME:	DIRECTORY/ FOLDER: \\LT\\D\\DLAP\\apr09_09_03.apr	
CONTRACT No.:	DELIVERY ORDER No.:	
SCALE:	REPORT DATE:	
DATE: January 2004	REVISION No.:	FIGURE No.: 2

ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
1530 Sycamore	Vacant property located on the north side of Sycamore St and directly west of an alley.	SYC-01530-A-C-0-2
		SYC-01530-B-C-0-1
1535 Sycamore	Vacant property located on the south side of Sycamore St and directly west of an alley.	SYC-01535-A-C-0-1
		SYC-01535-B-C-0-1
1559 Sycamore	Vacant property located on the south side of Sycamore and west of a house at 1553 Sycamore.	SYC-01559-A-C-0-1
		SYC-01559-B-C-0-2
1571 Sycamore	Vacant property located on the south side of Sycamore St and is the second vacant lot to the west of the house at 1553 Sycamore.	SYC-01571-A-C-0-1
		SYC-01571-B-C-0-1
3335 Cochrane	Vacant property located on the west side of Cochrane and two lots to the south of Sycamore St.	COC-03335-A-C-0-1
		COC-03335-B-C-0-1
3344 Harrison	Vacant property located to the east of Harrison at the corner of Harrison and Sycamore St.	HAR-03344-A-C-0-2
		HAR-03344-B-C-0-1
Downwind Properties		
Address	Description	Sample Identification
2921Fourth St*	Greenway located between Apt 939 & 933 of the Jeffries Housing Complex. Directly to the south of the Dewy Center For Urban Education and Martin Luther King Jr Blvd.	FRT-00939-A-C-0-1
		FRT-00939-B-C-0-1
2921 Fourth St**	Greenway located on the east side of the Lodge Service Dr and to the west of Apt 3139 of the Jeffries Housing.	FRT-03139-A-C-0-2
		FRT-03139-B-C-0-1
2921 Fourth St**	Greenway located between Apt 3253 & 3251 of Jeffries Housing and east of the Lodge Service Dr.	FRT-03253-A-C-0-1
		FRT-03253-B-C-0-1
2921 Fourth St**	Greenway located to the west of Apt 3437 and to the east of the Lodge Service Dr.	FRT-03437-A-C-0-1
		FRT-03437-B-C-0-2
3466 Lincoln West	Vacant property on the east side of Lincoln St and the second vacant lot to the south of the house.	LNW-03466-A-C-0-1
		LNW-03466-B-C-0-1
3490 Lincoln West	Vacant property on the east side of Lincoln St and directly south of a house.	LNW-03490-A-C-0-1
		LNW-03490-B-C-0-1

*Notes:

Sampled properties were identified by the apartment number closest to the greenway sampled. All were a part of the Jeffries Housing Complex at 2921 Fourth St.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
1530 Sycamore	SYC-01530-A-C-0-2	420
1530 Sycamore	SYC-01530-B-C-0-1	210
1535 Sycamore	SYC-01535-A-C-0-1	350
1535 Sycamore	SYC-01535-B-C-0-1	290
1559 Sycamore	SYC-01559-A-C-0-1	420
1559 Sycamore	SYC-01559-B-C-0-2	140
1571 Sycamore	SYC-01571-A-C-0-1	430
1571 Sycamore	SYC-01571-B-C-0-1	860
3335 Cochrane	COC-03335-A-C-0-1	270
3335 Cochrane	COC-03335-B-C-0-1	640
3344 Harrison	HAR-03344-A-C-0-2	200
3344 Harrison	HAR-03344-B-C-0-1	120
Downwind		
2921 Fourth St	FRT-00939-A-C-0-1	65
2921 Fourth St	FRT-00939-B-C-0-1	170
2921 Fourth St	FRT-03139-A-C-0-2	150
2921 Fourth St	FRT-03139-B-C-0-1	170
2921 Fourth St	FRT-03253-A-C-0-1	210
2921 Fourth St	FRT-03253-B-C-0-1	140
2921 Fourth St	FRT-03437-A-C-0-1	220
2921 Fourth St	FRT-03437-B-C-0-2	240
3466 Lincoln W	LNW-03466-A-C-0-1	71
3466 Lincoln W	LNW-03466-B-C-0-1	110
3490 Lincoln W	LNW-03490-A-C-0-1	41
3490 Lincoln W	LNW-03490-B-C-0-1	95

*Notes:

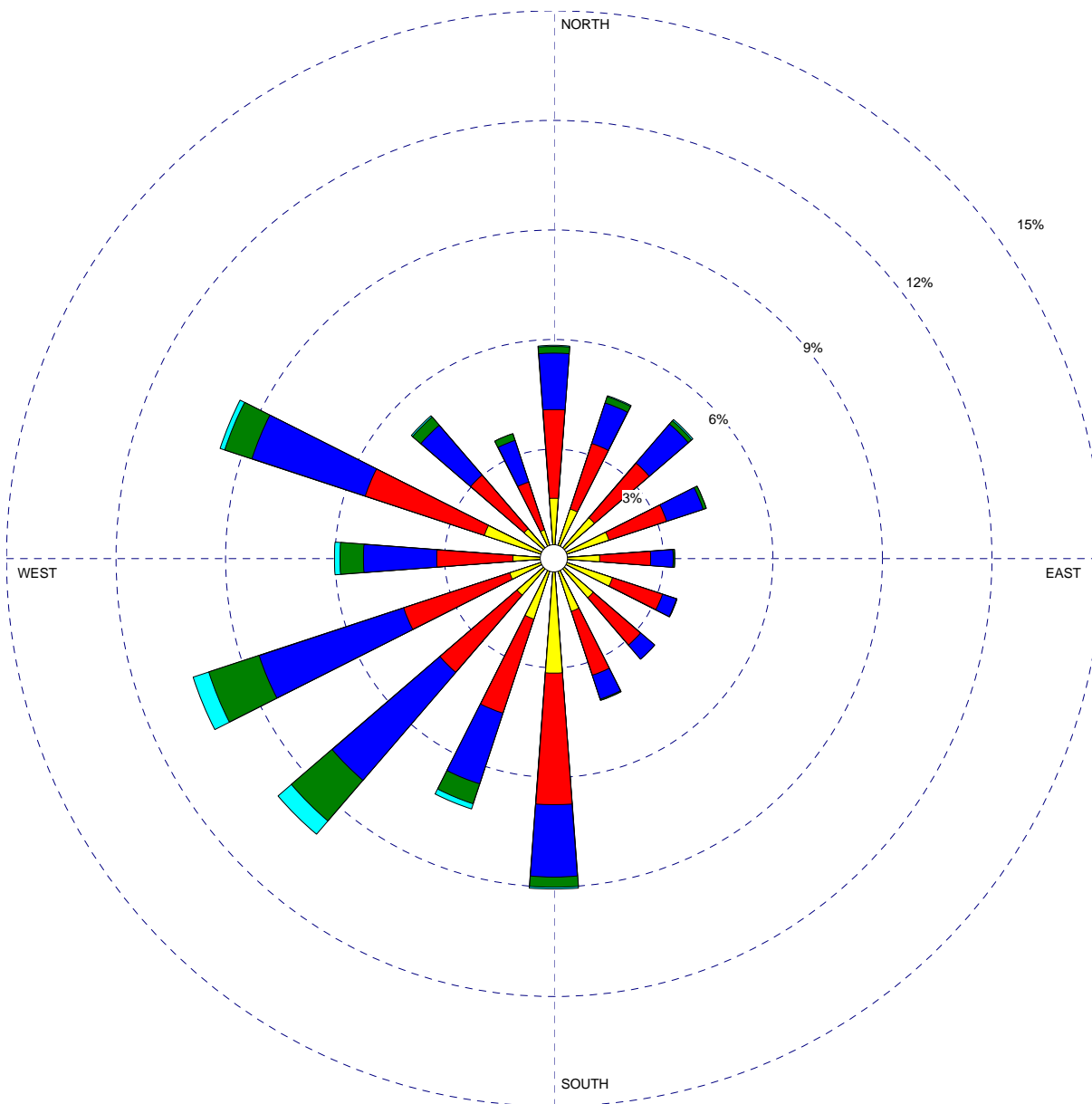
1) Bold indicates results equal to or greater than to 400 mg/kg.

ATTACHMENT C

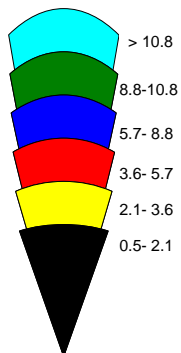
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

CLIENT/SUBJECT GIBSON

W.O. NO. _____

TASK DESCRIPTION SYC-01530 A+B SYC-01535 A+B

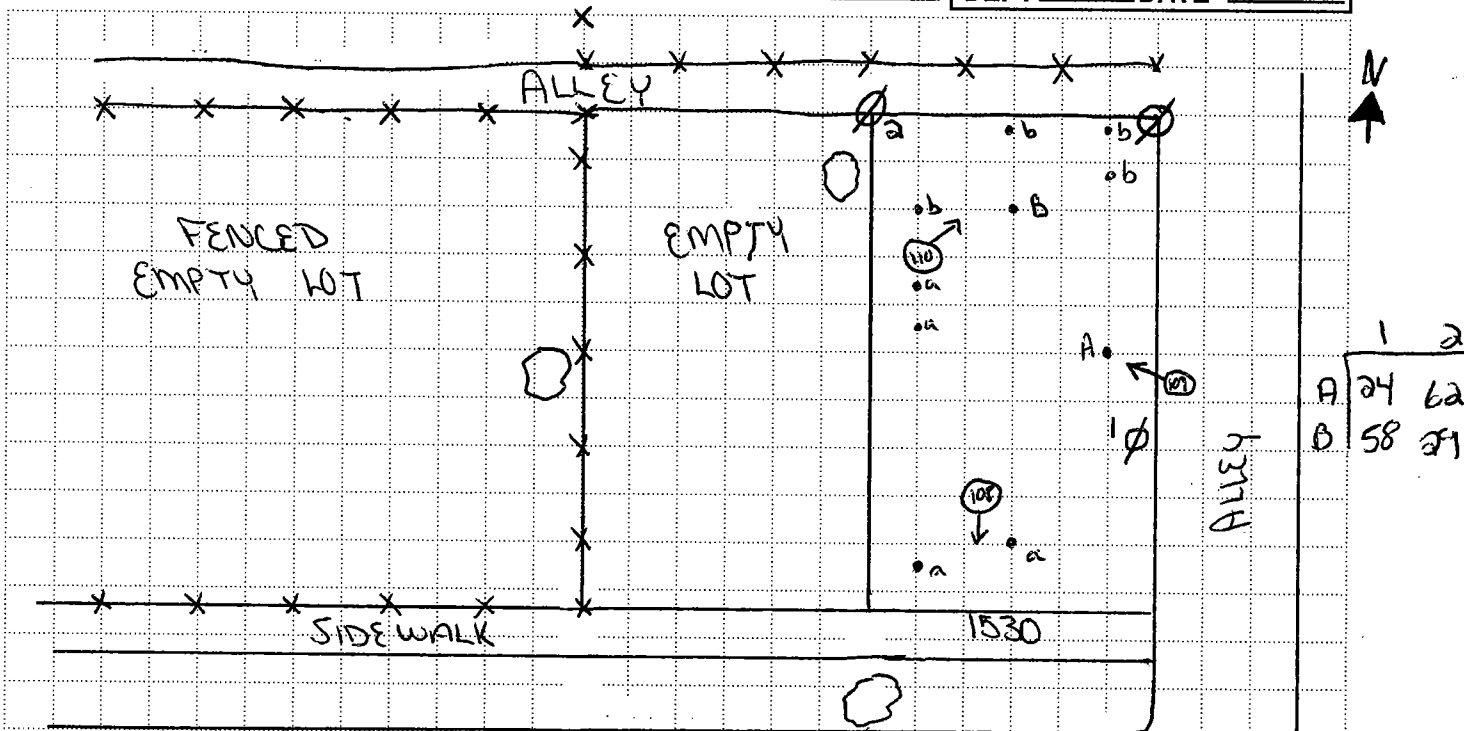
TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-20-03

MATH CHECK BY _____ DEPT _____ DATE _____

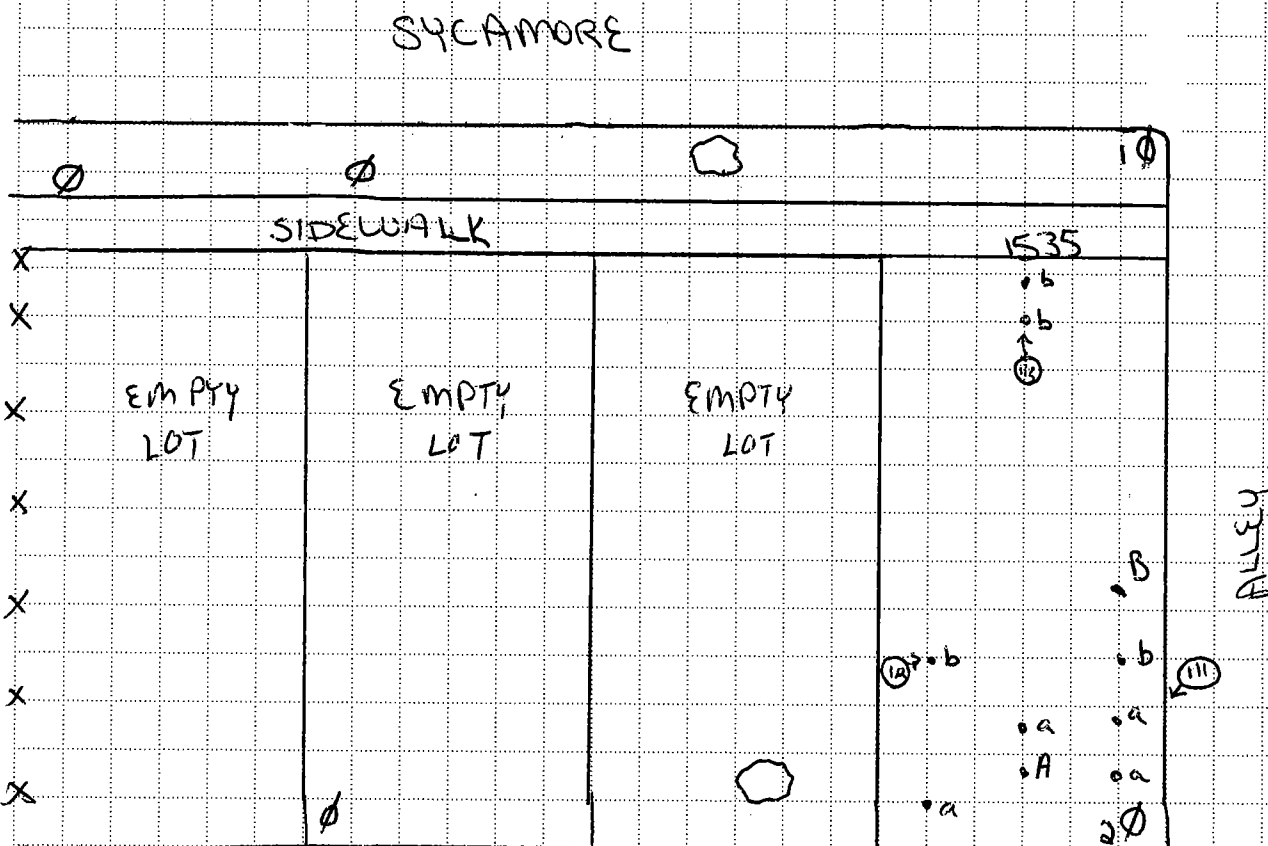
METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>	
DEPT _____	DATE _____



	1	2
A	24	62
B	58	21

	1	2
A	98	31
B	68	54



CLIENT/SUBJECT GIBSON W.O. NO. _____

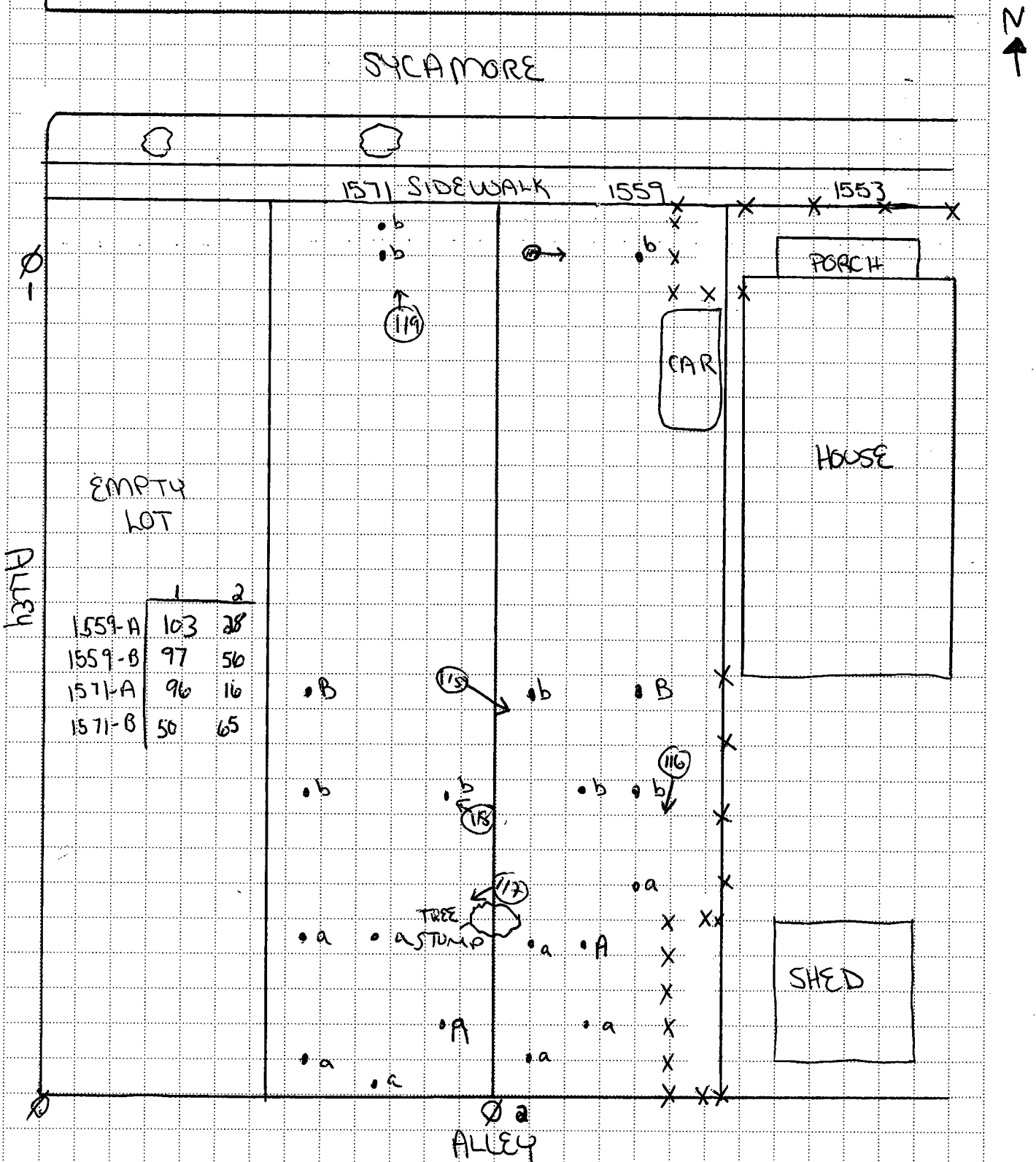
TASK DESCRIPTION SYC-01559 A+B S4601571 A+B TASK NO. _____

PREPARED BY A Freeman DEPT _____ DATE 11-20-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT GIBSON W.O. NO. _____

TASK DESCRIPTION 000-03335 A+B HAR-03344 A+B TASK NO. _____

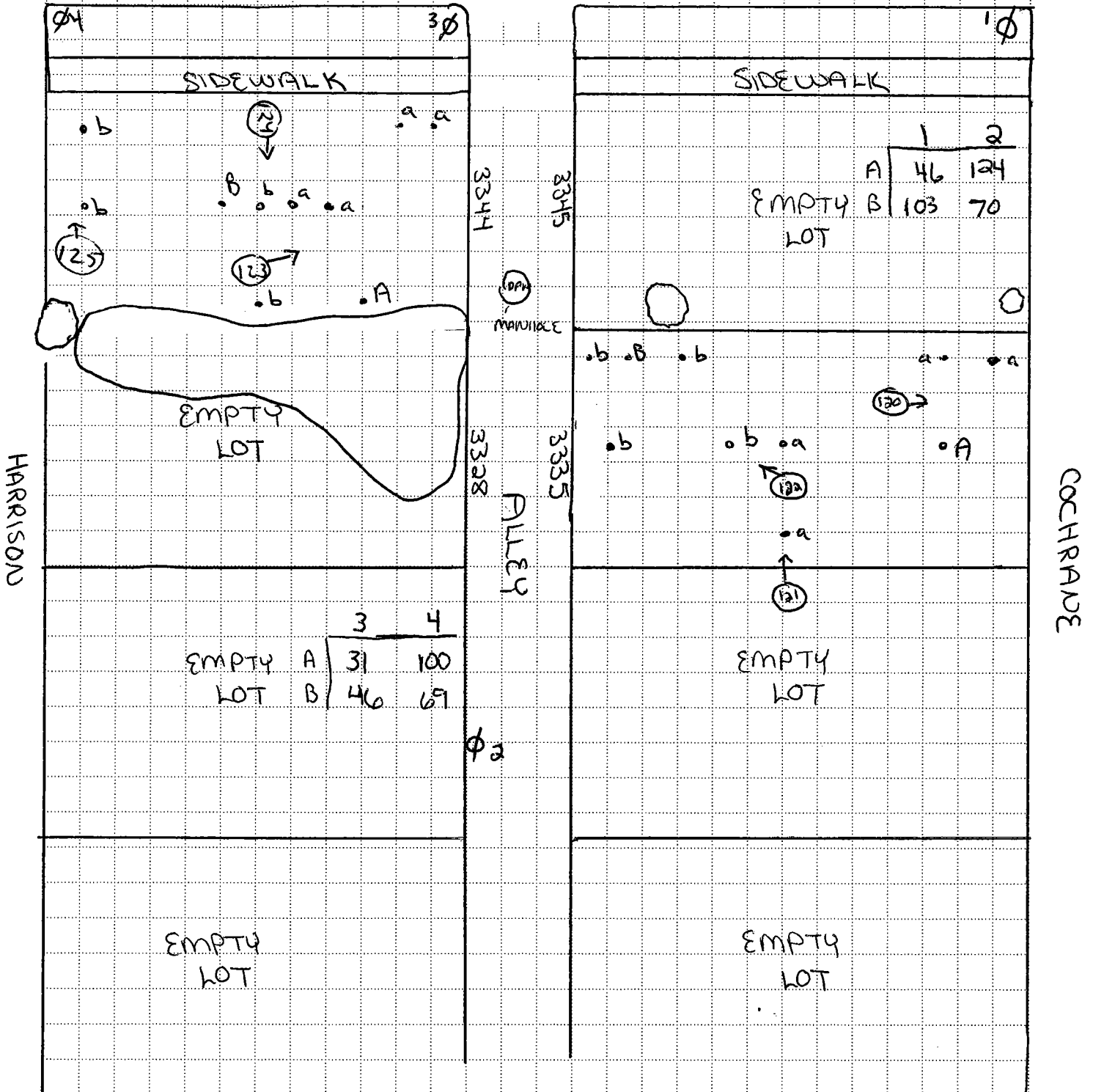
PREPARED BY A. Freeman DEPT _____ DATE 11-20-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____

SYCAMORE



CLIENT/SUBJECT GIBSON W.O. NO. _____

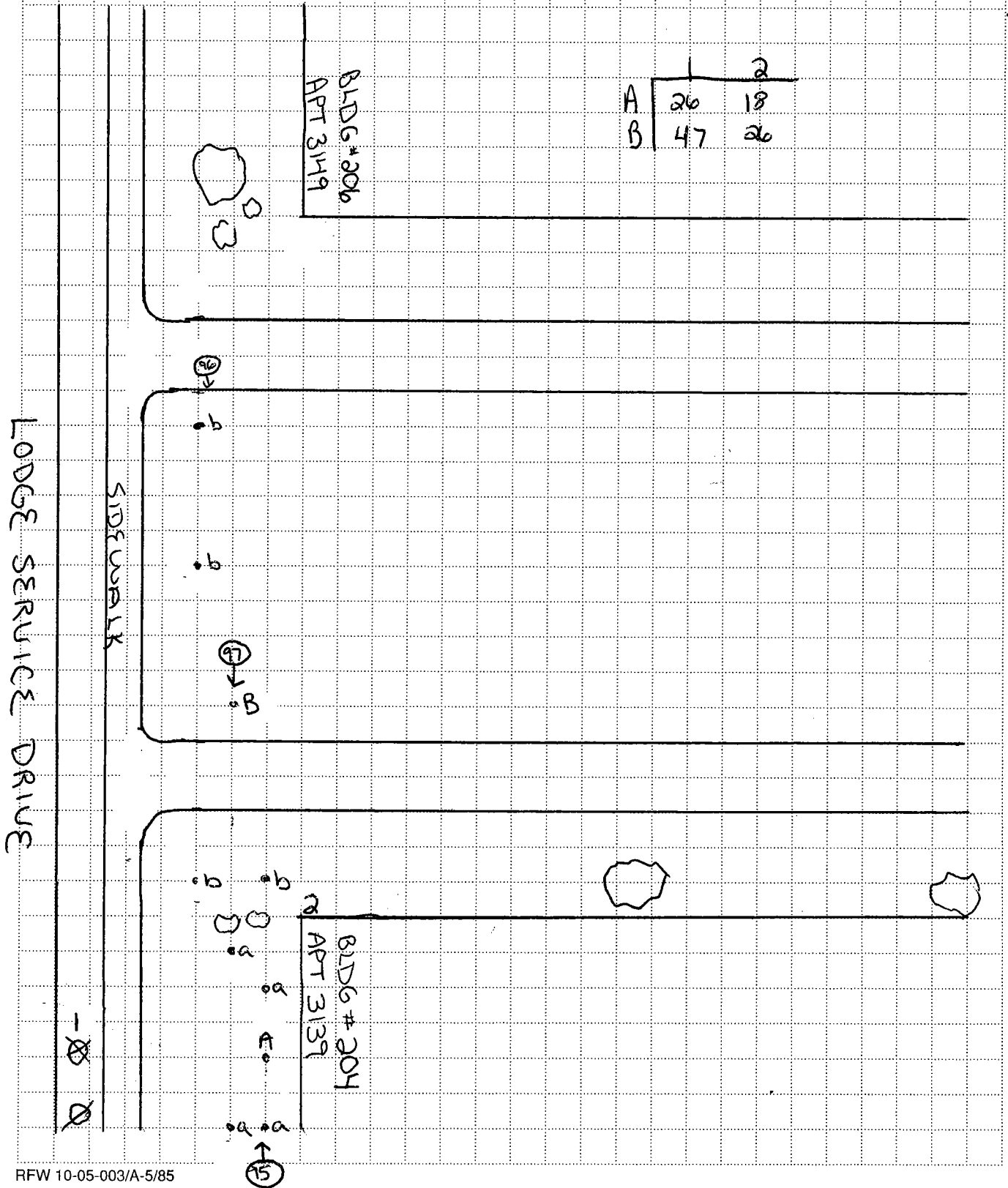
TASK DESCRIPTION FRT-03139 A+B TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-19-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT GIBSON

W.O. NO. _____

TASK DESCRIPTION FRT-03253 A+B

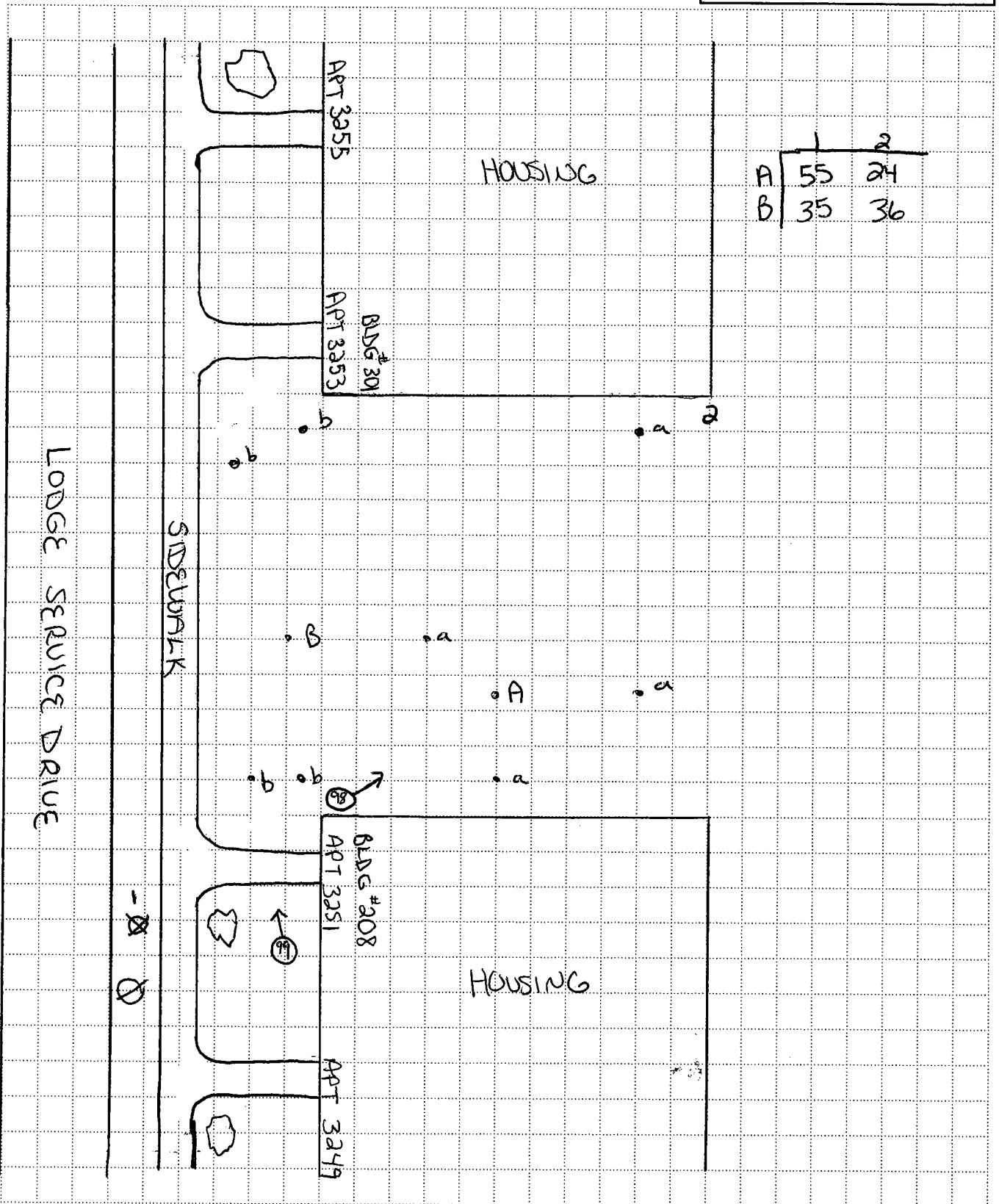
TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-19-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT GIBSON W.O. NO. _____

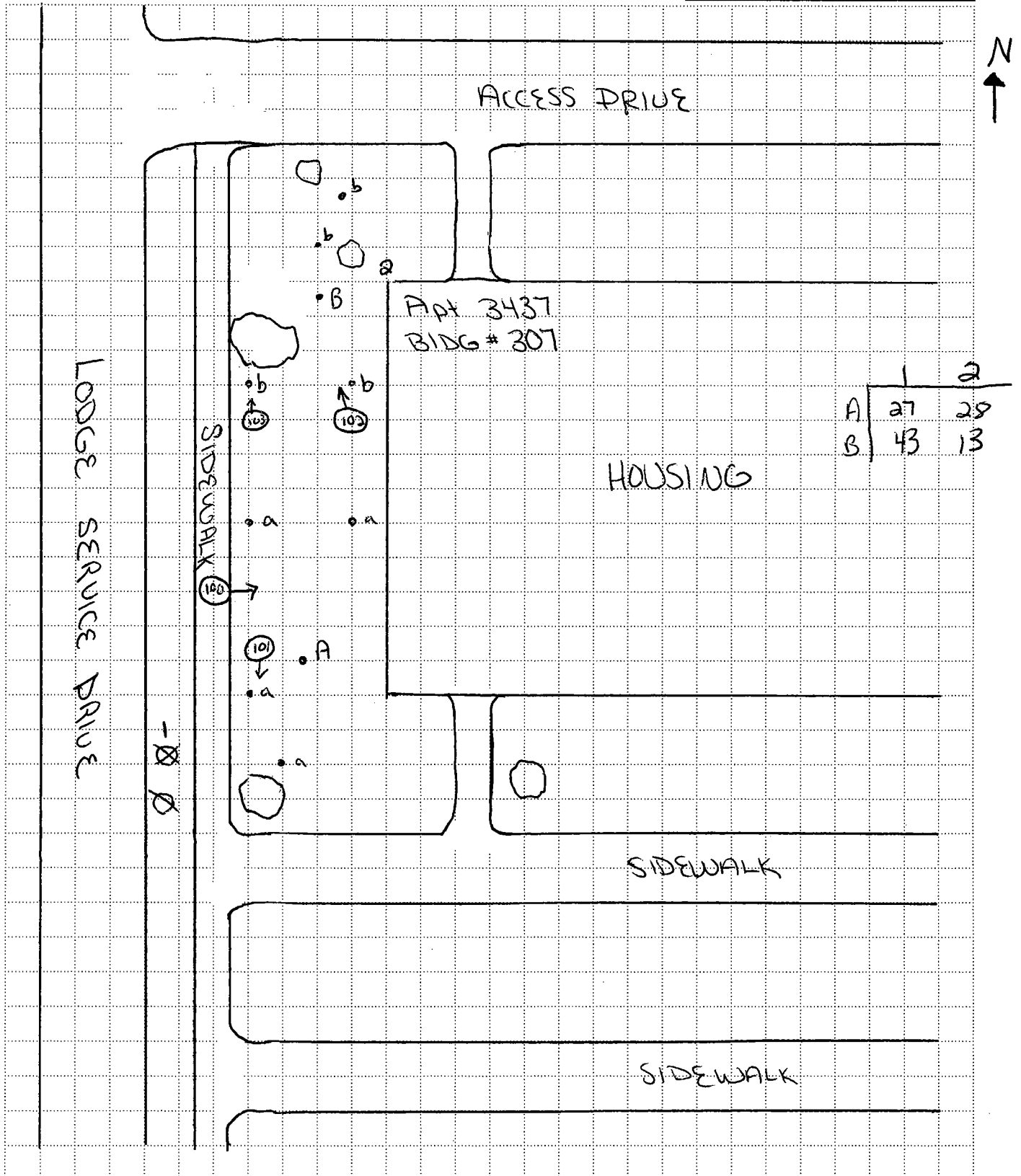
TASK DESCRIPTION FRT-03437 A+B TASK NO. _____

PREPARED BY A Freeman DEPT _____ DATE 11-19-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>	
DEPT _____	DATE _____



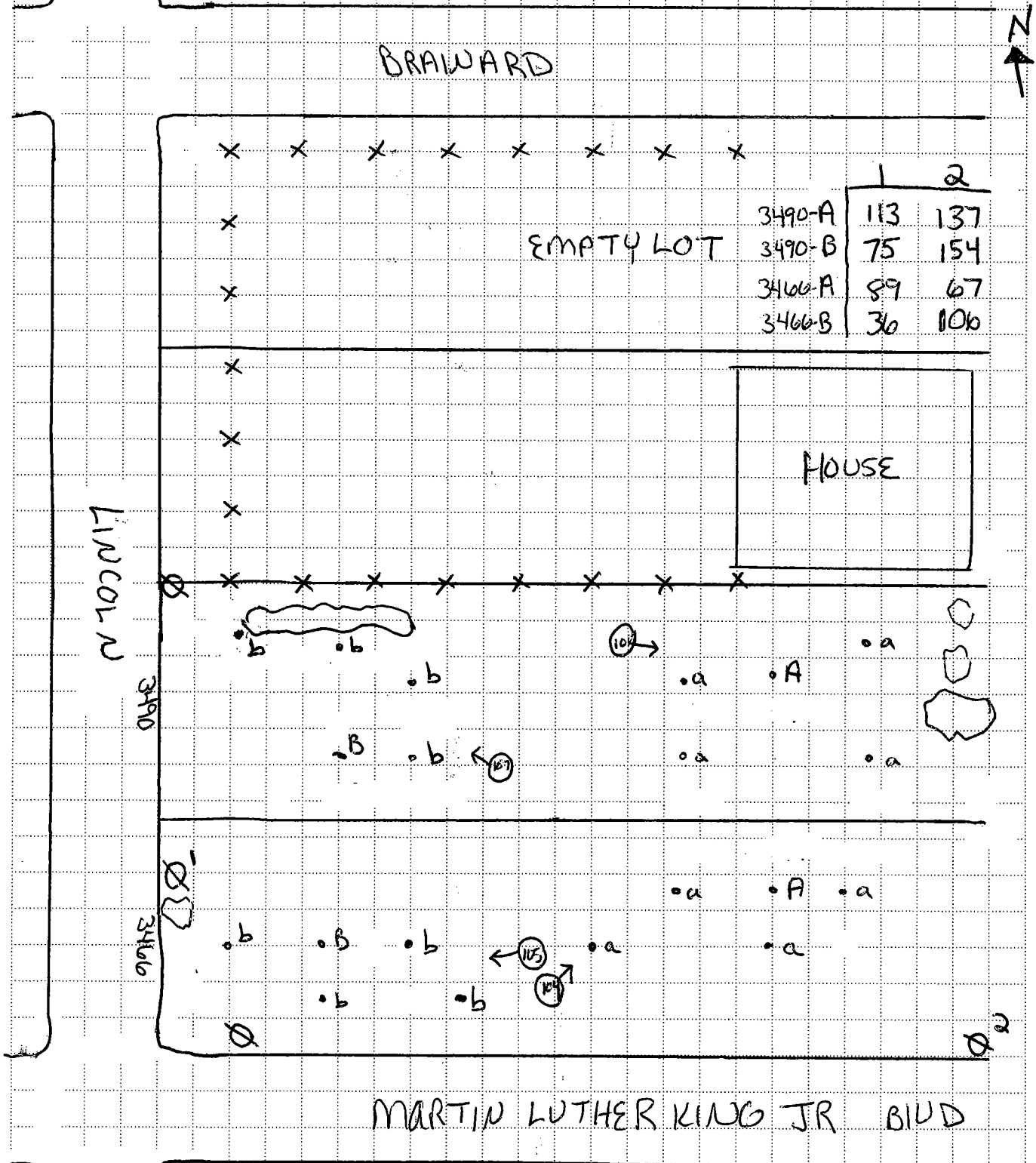
CLIENT/SUBJECT GIBSON LOW W.O. NO. _____
 TASK DESCRIPTION LA 03490 AB LA 03466 A+B TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-20-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



Former Wolverine White Metal – 3421 Gibson

1530 Sycamore – Vacant property located on the north side of Sycamore St and directly west of an alley.

Looking south and northwest, respectively, along the vacant property at 5 total discrete sample A locations.



Looking northeast along the vacant property at 5 discrete sample B locations.



Sycamore (cont'd)

1535 Sycamore – Vacant property located on the south side of Sycamore St and directly west of an alley.

Looking southwest along the vacant property at 5 discrete sample A locations.



Looking east and north, respectively, along the vacant property at 5 total discrete sample B locations.



Sycamore (cont'd)

1559 Sycamore – Vacant property located on the south side of Sycamore St and west of a house at 1553 Sycamore.

Looking southwest along the vacant property at 5 discrete sample A locations.



Looking east and southeast, respectively, along the vacant property at 5 total discrete sample B locations.



Sycamore (cont'd)

1571 Sycamore – Vacant property located on the south side of Sycamore St and it is the second vacant lot on the west of the house at 1553 Sycamore.

Looking southwest along the vacant property at 5 discrete sample A locations.



Looking northwest and north, respectively, along the vacant property at 5 total discrete sample B locations.



Sycamore (cont'd)

3335 Cochrane – Vacant property located on the west side of Cochrane and it is the second lot to the south of Sycamore St.

Looking east and north, respectively, along the vacant property at 5 total discrete sample A locations.



Looking northwest along the vacant property at 5 discrete sample B locations.



Sycamore (cont'd)

3344 Harrison – Vacant property located to the east of Harrison St and at the corner of Harrison and Sycamore St.

Looking northeast along the vacant property at 5 discrete sample A locations.



Looking south and north, respectively, along the vacant property at 5 total discrete sample B locations.



Sycamore (cont'd)

939 Fourth St – Greenway located between Apartment 939 and 933 of the Jeffries Housing Complex. It is directly to the south of the Dewy Center For Urban Education and also south of Martin Luther King Jr Blvd.

Looking southwest along the greenway at 5 discrete sample A locations.



Looking south along the greenway at 5 total discrete sample B locations.



Sycamore (cont'd)

3139 Fourth St – Greenway located on the east side of the Lodge Service Dr and to the west of Apt 3139 of the Jeffries Housing Complex.

Looking north along the greenway at 5 discrete sample A locations. Sample B locations are further to the north in this photo.



Looking south along the greenway at 5 total discrete sample B locations.



Sycamore (cont'd)

3253 Fourth St – Greenway located between Apt 3253 and 3251 of the Jeffries Housing Complex and east of the Lodge Service Dr.

Looking northeast along the greenway at 5 discrete sample A locations.



Looking north along the greenway at 5 discrete sample B locations.



Sycamore (cont'd)

3437 Fourth St – Greenway located to the west of Apt 3437 and to the east of the Lodge Service Dr.

Looking east and north, respectively, along the greenway at 5 total discrete sample A locations.



Looking northwest and north, respectively, along the greenway at 5 discrete sample B locations.



Sycamore (cont'd)

3466 Lincoln West – Vacant property on the east side of Lincoln West St and it is the second vacant lot to the south of the house.

Looking northeast along the vacant property at 5 discrete sample A locations.



Looking west along the vacant property at 5 discrete sample B locations.



Sycamore (cont'd)

3490 Lincoln West – Vacant property located on the east side of Lincoln St and directly south of a house.

Looking to the northeast along the vacant property at 5 discrete sample A locations.

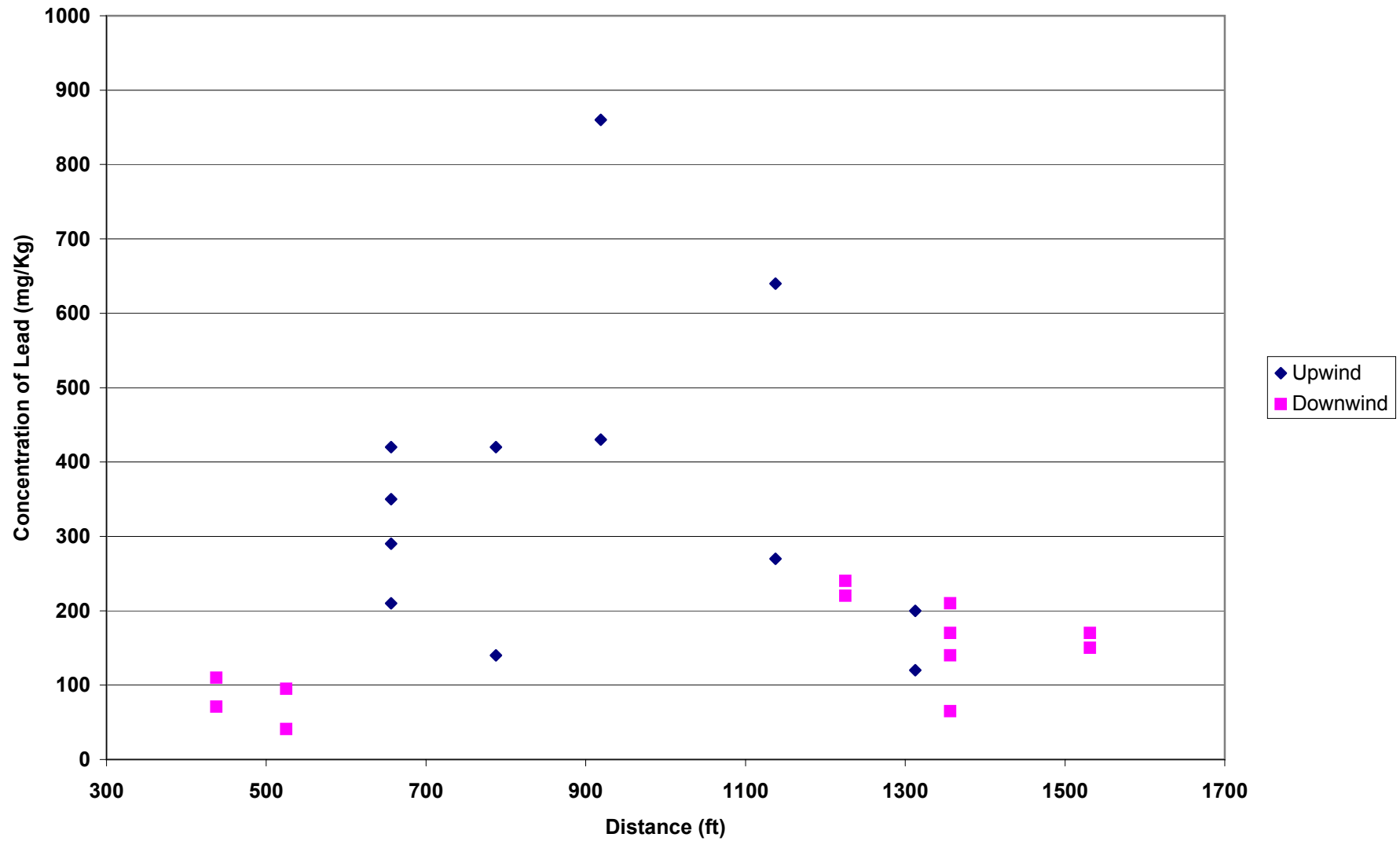


Looking to the northwest along the vacant property at 5 discrete sample B locations.



ATTACHMENT E
CONCENTRATION GRAPH

3421 Gibson



Wolverine

*** Linear Model ***

Call: lm(formula = Lead.ppm ~ Location + Distance + Distance:Location, data = Wolverine, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-231.2	-80.09	-11.91	45.67	498

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	426.3381	182.1728	2.3403	0.0297
Location	-381.1810	222.1705	-1.7157	0.1017
Distance	-0.0700	0.1931	-0.3628	0.7206
Distance:Location	0.1587	0.2223	0.7138	0.4836

Residual standard error: 163.3 on 20 degrees of freedom

Multiple R-Squared: 0.3731

F-statistic: 3.968 on 3 and 20 degrees of freedom, the p-value is 0.0227

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	296592.7	296592.7	11.12544	0.0032964
Distance	1	7174.4	7174.4	0.26912	0.6096179
Distance:Location	1	13583.3	13583.3	0.50952	0.4835943
Residuals	20	533179.0	26659.0		

*** Linear Model ***

Call: lm(formula = LogLead ~ Distance + Location + Location:Distance, data = Wolverine, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-0.8657	-0.2056	-0.01748	0.3125	1.022

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	6.1784	0.5921	10.4348	0.0000
Distance	-0.0005	0.0006	-0.7689	0.4509
Location	-2.1838	0.7221	-3.0242	0.0067
Location:Distance	0.0013	0.0007	1.7347	0.0982

Residual standard error: 0.5307 on 20 degrees of freedom

Multiple R-Squared: 0.5367

F-statistic: 7.723 on 3 and 20 degrees of freedom, the p-value is 0.001282

Analysis of Variance Table

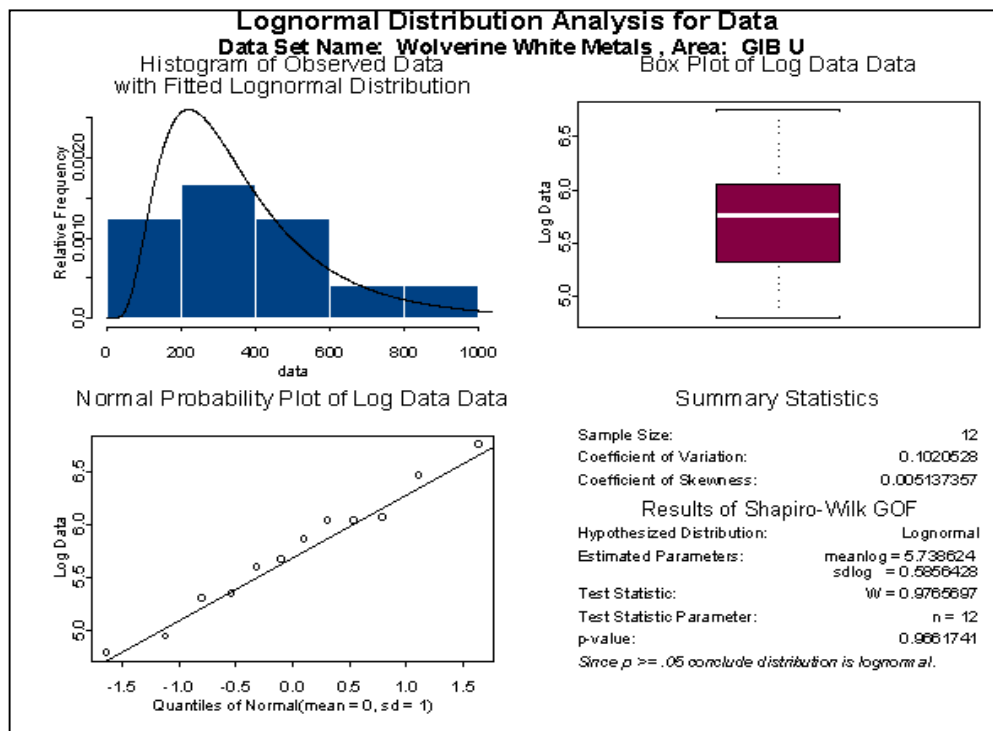
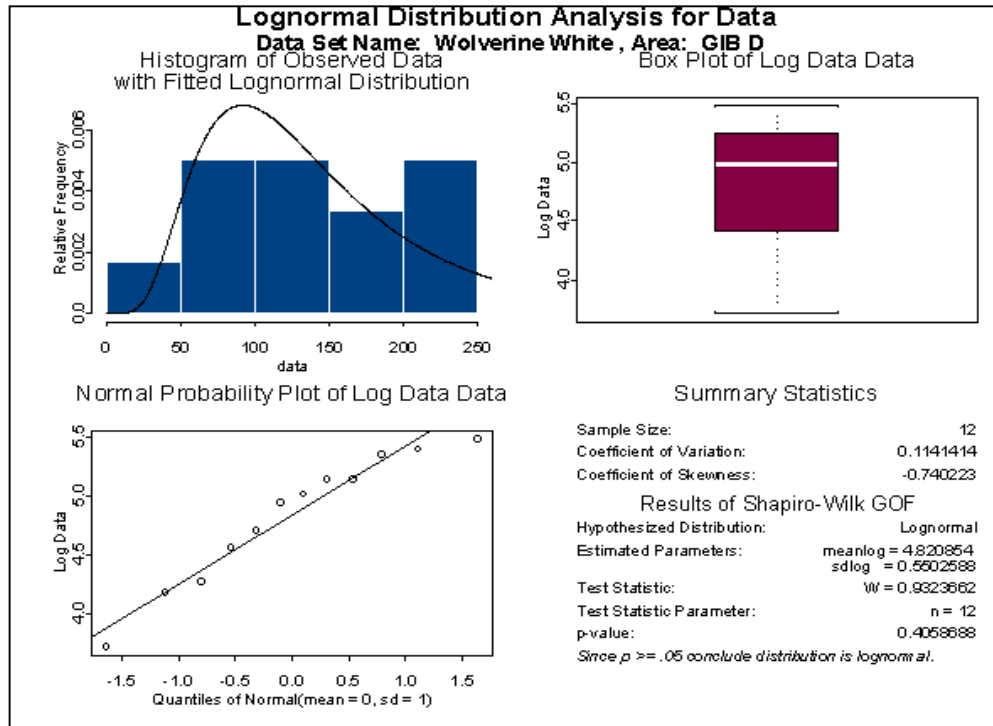
Response: LogLead

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Distance	1	0.070205	0.070205	0.24929	0.6230224
Location	1	5.607193	5.607193	19.91058	0.0002390
Location:Distance	1	0.847427	0.847427	3.00913	0.0981832
Residuals	20	5.632375	0.281619		

ATTACHMENT F
STATISTICAL DISTRIBUTION

WOLVERINE WHITE METAL STATISTICAL DISTRIBUTION



Appendix I

City Metals Refining Phase I Summary Report

**DRAFT
PHASE I SAMPLING REPORT
FOR**

**DETROIT LEAD ASSESSMENT PROJECT
CITY METALS REFINING – 2945 HUBBARD STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDIATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place

Suite 2-300

3058 West Grand Boulevard

Detroit, Michigan 48202

Prepared by

WESTON SOLUTIONS OF MICHIGAN, INC.

2501 Jolly Road

Suite 100

Okemos, MI 48864

February 2004

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct offsite sampling for the Detroit Lead Assessment Project (the project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former City Metals Refining (the Facility), 2945 Hubbard Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 14 November, 2003 WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. The results of this investigation do not indicate that downwind soils at properties have been impacted by releases of lead from the Facility as a result of aerial deposition related to historic smelting operations. However, to be certain that the conclusions are based on enough data it is recommended that additional soil samples be collected from additional properties located within 1500 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical Site operations;
- Perform a Site walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

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Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the project) in Detroit, Wayne County, Michigan. This report addresses work that was conducted in the vicinity of the former City Metals Refining (the Facility), 2945 Hubbard Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- Section 1 - Introduction;
- Section 2 - Site Information;
- Section 3 - Field Activities and Procedures;
- Section 4 - Phase I Analytical Results; and
- Section 5 - Recommendations

Attachments to this Summary Report include the following:

- **Attachment A** Figures
- **Attachment B** Tables
- **Attachment C** Wind Rose Plot
- **Attachment D** Photographs of Sampling Locations
- **Attachment E** Concentration Graph

- **Attachment F** Statistical Distribution

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 2945 Hubbard St in Detroit, Wayne County Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser's city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the "Summary Report for Data Investigation, Detroit Lead Assessment Project" dated September 2003, concluded that the facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of offsite properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The actual Facility could not be located, but appears to be located on property currently occupied by Piston Automotive that is enclosed within a concrete wall. The area five blocks to the north of the Facility is residential. The area to the south of the Facility is industrial for four blocks and residential for at least the next one block. The area five blocks east of the Facility is a mixture of residential, industrial, and commercial. The area five blocks west of the Facility is industrial.

2.1.2 Site History

A review of the Bresser's directory indicated that City Metals Refining owned the property from 1946 to 1971. Liberman R C OFC was a co-owner in 1951. There are no listings for the address from 1971 to the present.

Review of the Sanborn maps for this address show that in 1950 a Metal Refining Plant was present with a Smelting Furnace.

The aerial photograph review showed that this address was located in an industrial area. The property is currently vacant but the surrounding area is still industrialized with light residential use approximately 600 feet to the north, east and south. Structures were not identified from the most recent aerial photograph (2003 GlobeXplorer™) and the entire lot appears paved for parking. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the Fire Records, no records were found.

Review of the BEA for a property located at the “northeast corner of Ash and Vinewood”, date unknown, NTH Consultants Ltd. for Alternatives for Girls, indicates that lead was detected on the sites at levels up to 360 mg/kg and did not exceed the MDEQ Part 201 RDCC.

2.2 SITE CONCERNS

The primary concern associated with the City Metals Refining facility is the off-site release of smelter-related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter-related releases were present offsite and could be attributed to the former facility. The general sampling protocol presented in Section 2 of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1000-foot radius stated in the Quality Assurance Sampling Plan, so the radius was increased.

Prior to sample collection, upwind and downwind sampling areas were established, 2100 and 1350 feet from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit metropolitan area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or State owned properties located within these established areas.

The City and/or State owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual City or State owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, photo documentation) were conducted as described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project*. Because 12 City and/or State owned parcels were not available in the sample radius for the Facility, WESTON collected samples from 6 parcels and 5 greenways near the Facility. Six City and/or State owned parcels were sampled in the downwind direction and

five greenway parcels were sampled in the upwind direction due to size and availability of the properties. Two composite samples were collected from each of the 6 downwind parcels and four of the upwind greenways. Four composite samples were collected from one large upwind greenway which was approximately four average sized parcels. A total of 24 composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky, Ms. Amanda Freeman, Ms. Shamille Lewis, and Mr. Erik Martinson conducted field sampling on 14 November, 2003. WESTON personnel, Ms. Amanda Freeman and Ms. Shamille Lewis completed field sampling on 5 and 8 December, 2003. Since City and/or State owned parcels were not available upwind, WESTON selected greenways, prior to the sampling event, and submitted them to the City of Detroit to obtain their approval and access. When greenways were not located on the same street as the mailing address of the nearest building, the number of the building was used in conjunction with the street of the greenway. For example, a greenway located at 2350 Scotten Street with an adjoining property located next door with a visible mailing address, would be identified as SCT – 02350. These changes were noted in the logbook and can be viewed on the “Summary Table For Sample Properties” (**Attachment B**) and the sample sketches (**Attachment A**).

WESTON collected samples from five upwind greenways: Two composite samples were collected from each of the four upwind greenways and four composite samples were collected from the fifth larger upwind greenway for a total of 12 upwind samples. Also, two samples were taken from each of the six downwind City and/or State owned parcels for a total of twelve 12 samples. Twenty four soil samples were submitted for analysis. Four samples were designated as an matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Michigan Smelting facility project area:

- 12 composite soil samples in the upwind direction
- 12 composite soil samples in the downwind direction

Sample locations from both the upwind and downwind areas are listed in Table 1 included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis by United States Environmental Protection Agency (U.S. EPA) Method 6010B for lead. Four samples collected from properties upwind of the former facility contained concentrations of lead above the project screening level (400 milligrams/kilogram [mg/kg]) established in the Phase I QASP. Samples collected from properties downwind of the former facility did not contain concentrations of lead above the project screening level (400mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	4	97-490
Downwind	12	0	110-340
TOTAL	24	4	97-490

4.2 Atmospheric Conditions

During Phase I soil sampling activities, upwind and downwind parcels were selected based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the city of Detroit Metropolitan area. If smelting operations occurred, lead in soils resulting from aerial deposition would be detected downwind in the northeast direction from the Facility. Parcels were not chosen southwest in the major upwind direction due to lack of residential receptors within 1500 feet. Parcels ranging from 1725 feet to 2100 feet were selected south in the upwind direction of the Facility. Parcels ranging from 600 feet to 1350 feet were selected northeast, as close to the mean downwind direction of the Facility due to the presence of residential properties. Elevated lead concentrations were found in the upwind direction of the Facility and low-level lead concentrations (<400 mg/kg) were detected in the downwind direction. A detailed analysis of upwind and downwind concentrations is contained in section **4.3 Spatial Analysis**.

4.3 Spatial Analysis

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus the Phase I investigation was designed to determine if an off-site airborne release had occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary upwind envelope.

To determine the distribution of the lead concentrations in soils as the distance from the Facility site increases, WESTON evaluated the lead concentration of samples versus the distance from the facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated elevated levels of lead occurred in the upwind direction. The downwind direction showed low concentrations less than the screening level (400mg/kg) of lead in the downwind direction with no statistical trend of decreasing concentrations with increasing distance from the

facility. These conclusions were confirmed by a linear regression of the concentrations versus distance data (**Attachment E**).

4.4 Statistical Analysis

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F** the downwind mean is 212 mg/kg and the upwind mean is 326 mg/kg indicating the concentrations upwind are greater than the downwind. In addition the relative frequency histogram (**Attachment F**) for the downwind data is an uneven distribution across the sample set while the upwind results exhibit a more even increasing distribution. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data represent separate conditions.

4.5 Conclusions

The pattern of analytical results for lead in soil samples collected for the Facility suggests that lead contamination detected in downwind locations may be attributable to historic releases from historic smelting operations at the Facility. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and Environmental Protection Act 1994, as amended.

Samples collected from upwind of the Facility contained concentrations of lead above the screening level but do not appear to be consistent with other levels found at upwind locations and indicated no reason for the elevated concentrations. The downwind samples show a clear trend of decreasing concentration with increasing distance. The levels of lead start at 270 mg/kg (600 feet from the facility) and decrease from there out to a distance of 1400 feet from the facility (with the exception of a single sample with a concentration of 340 mg/kg at approximately 1300 feet). The data collected during the Phase I sampling does not support that an identifiable aerial release occurred from the Site during historic smelting operations.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

The results of this investigation do not indicate that downwind soils at properties have been impacted by releases of lead from the Facility as a result of aerial deposition related to historic smelting operations. However, to be certain that the conclusions are based on enough data it is recommended that additional soil samples be collected from additional properties located within 1500 feet downwind of the Facility.

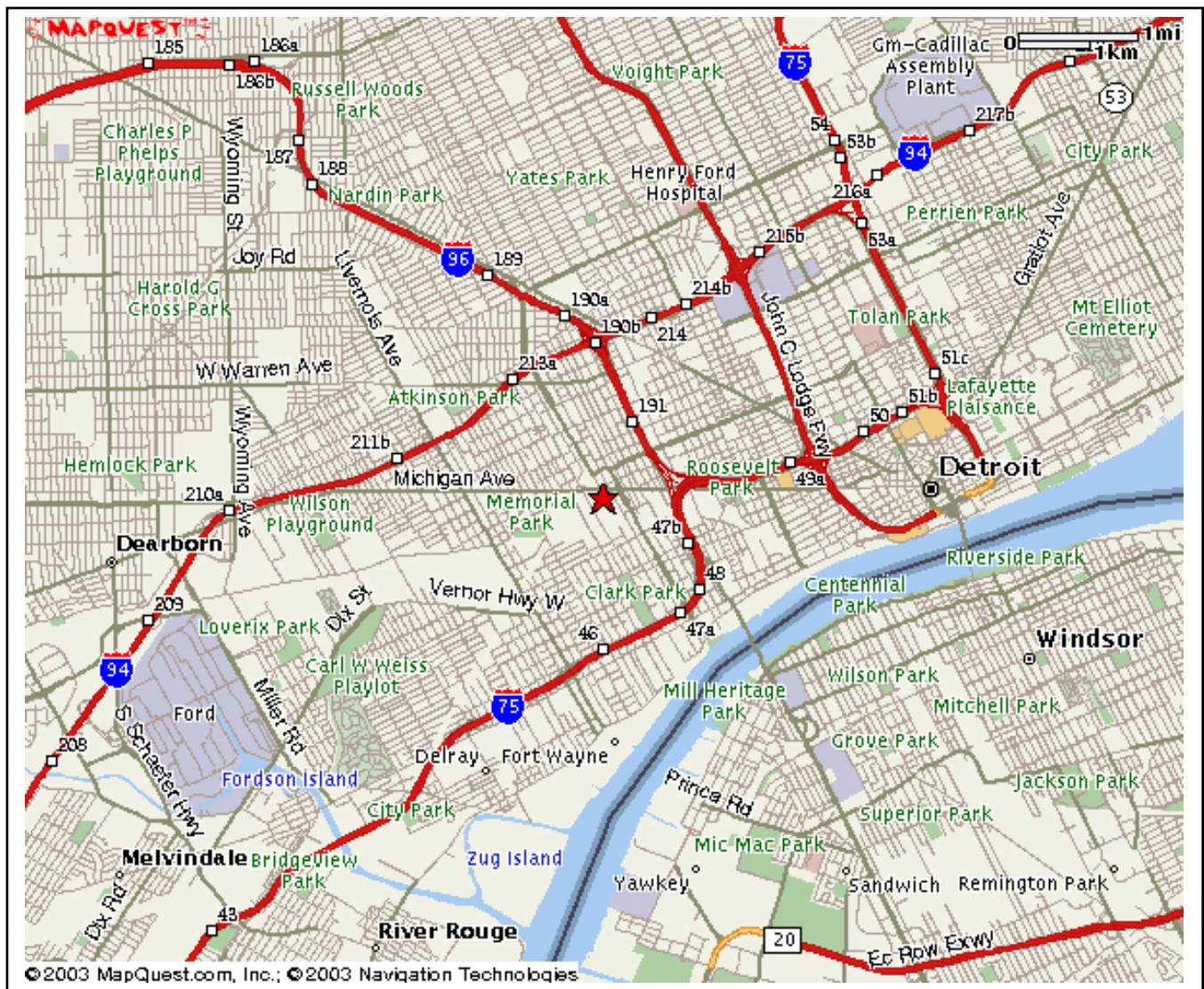
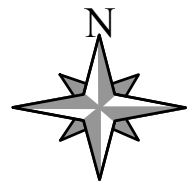
If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning):
- Interview past employees regarding historical Site operations;
- Perform a Site walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
2945 Hubbard Street

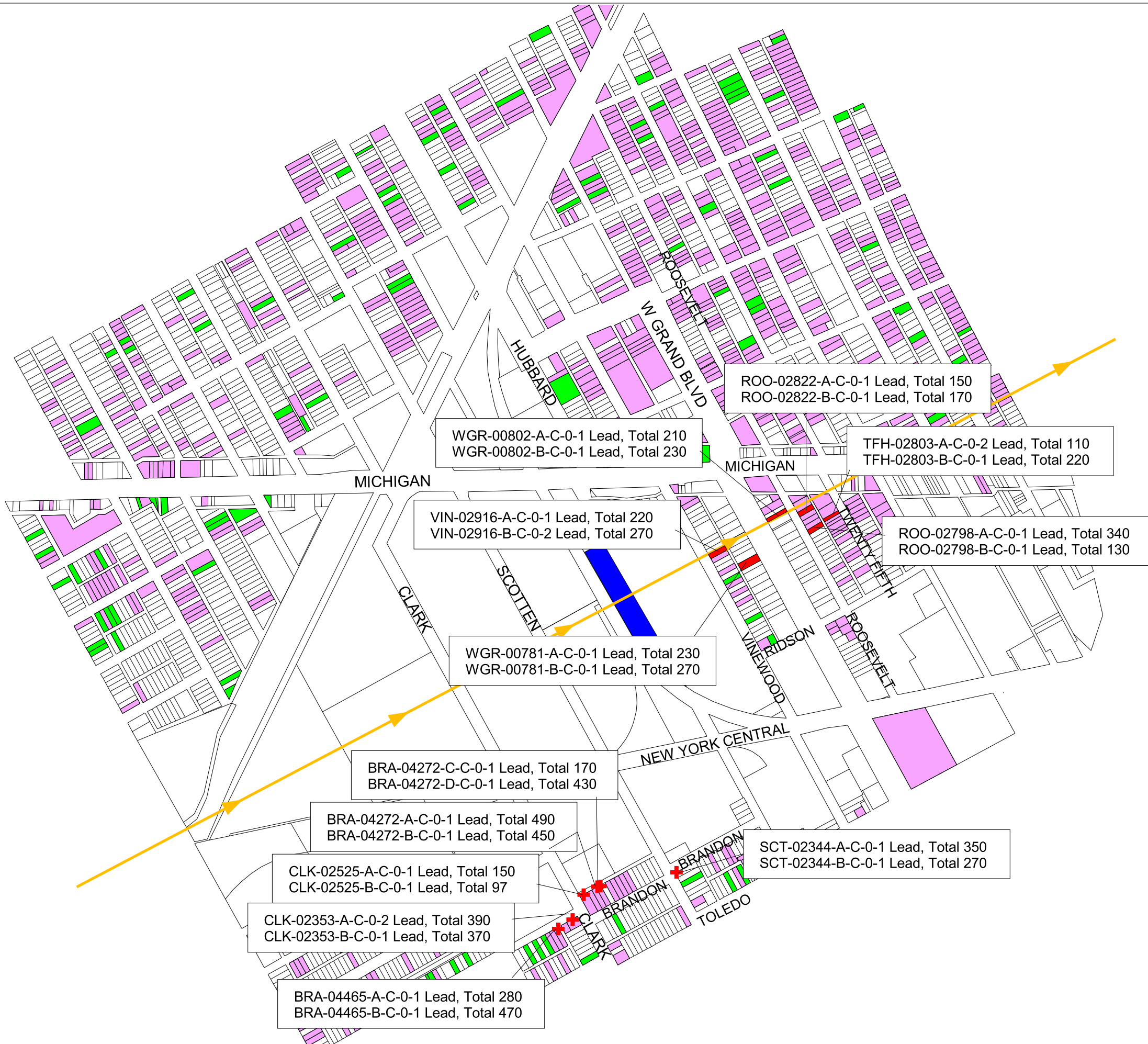


WESTON SOLUTIONS, INC. OF MICHIGAN



300 River Place, Suite 2800
Detroit, Michigan 48207

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001



LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

Sampled Properties (Greenway)

Parcel Boundaries

Sampled Properties

Facility of Concern

State Owned Property

City Owned Property

Wind Direction

Note: All Lead, Total analytical results are shown in mg/kg.

N

0 600 Feet

WESTON
SOLUTIONS SM

PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

City Metals Refining
2945 Hubbard Street

WORK ORDER No.:	20083.028.001	PROJECT MANAGER:	
DRAWN BY:	JLT	CHECKED BY:	
DRAWING NAME:	DIRECTORY/ FOLDER: JLT\\ID\\DLAP\\apr09_09_03.apr		
CONTRACT No.:	DELIVERY ORDER No.:		
SCALE:	REPORT DATE:		
DATE: January 2004	REVISION No.:	FIGURE No.: 2	

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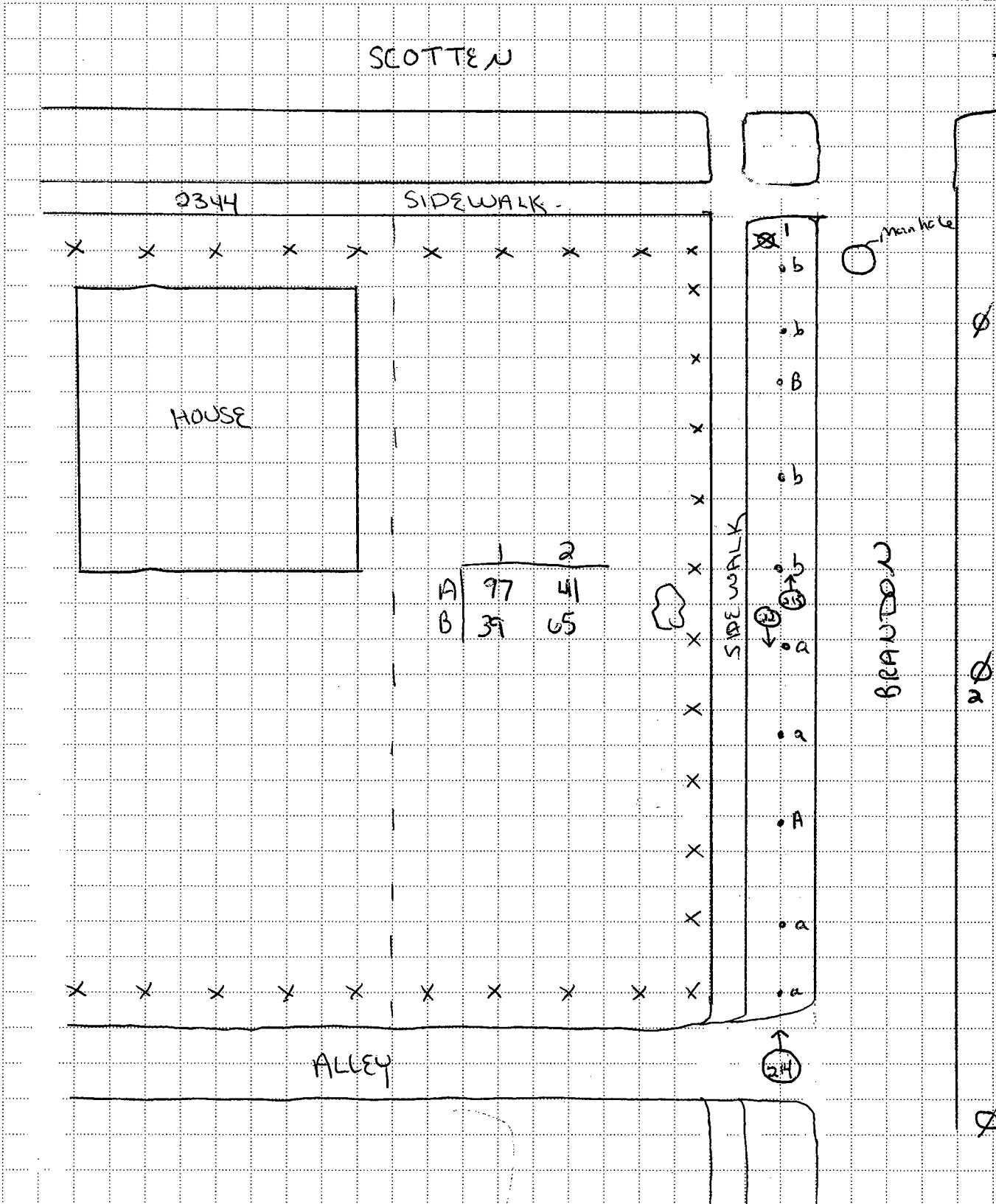
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METHOD REV. BY _____ DEPT _____ DATE _____

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DEPT _____	DATE _____



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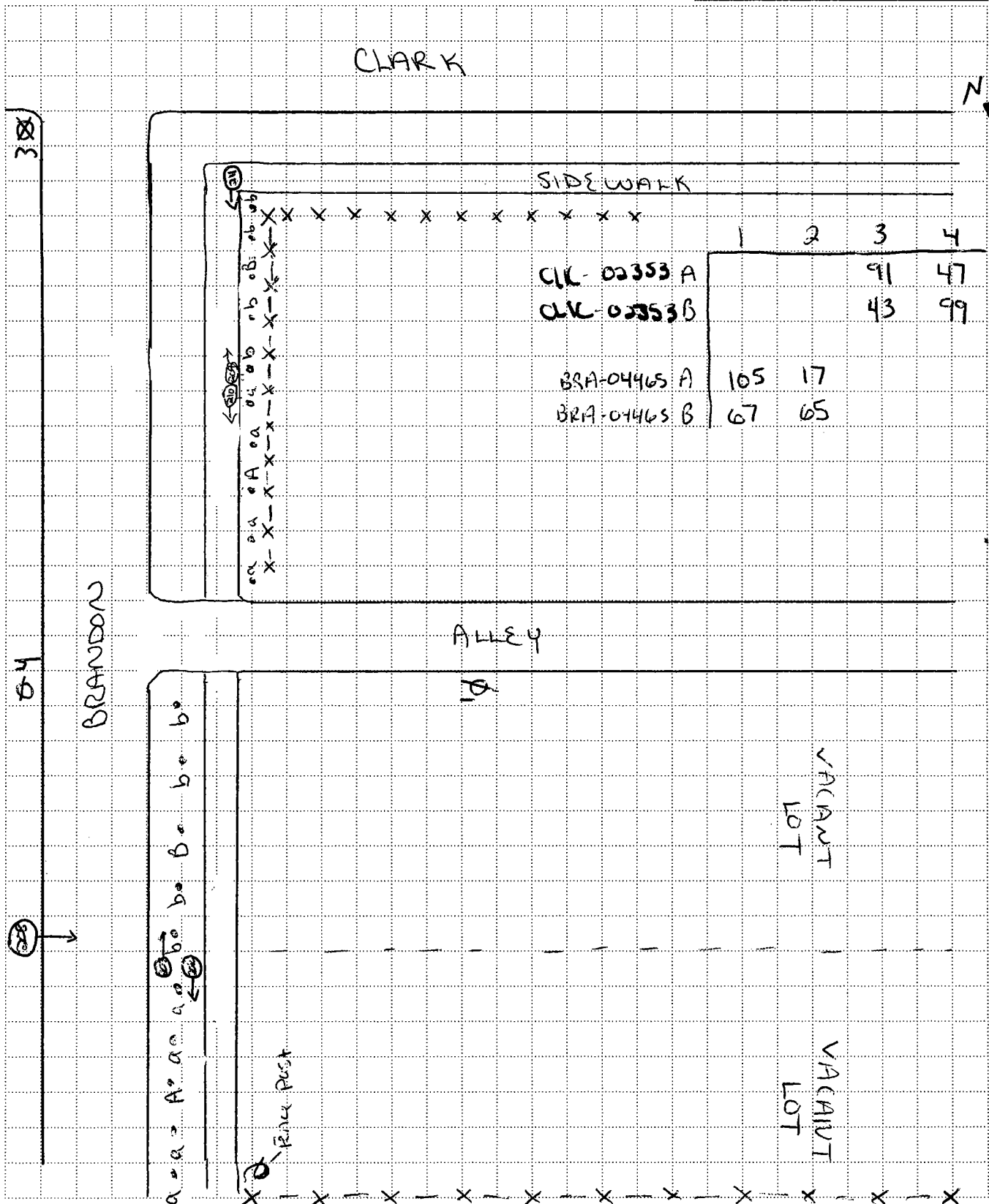
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METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT HUBBARD W.O. NO. _____

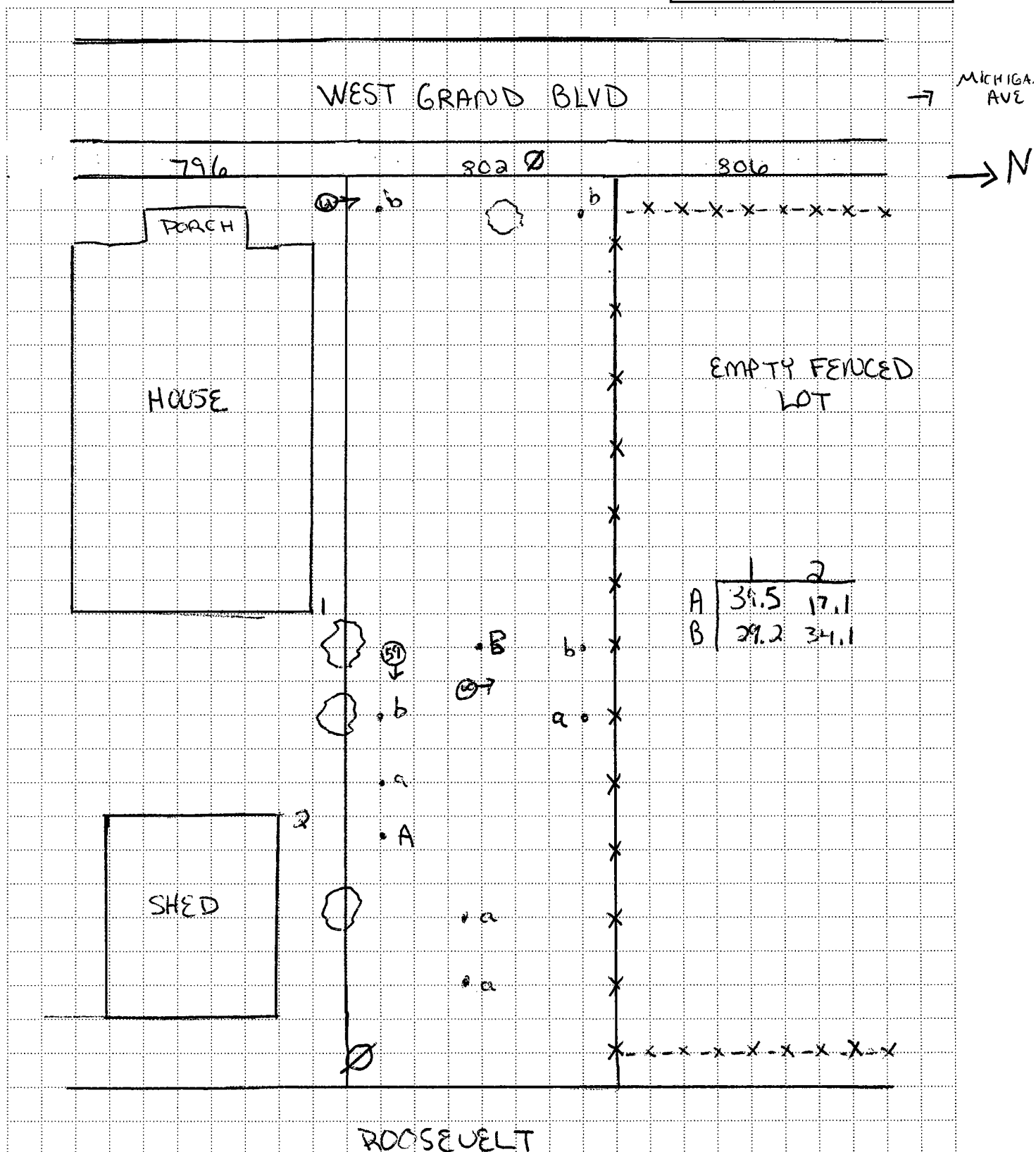
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DEPT _____	DATE _____



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MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

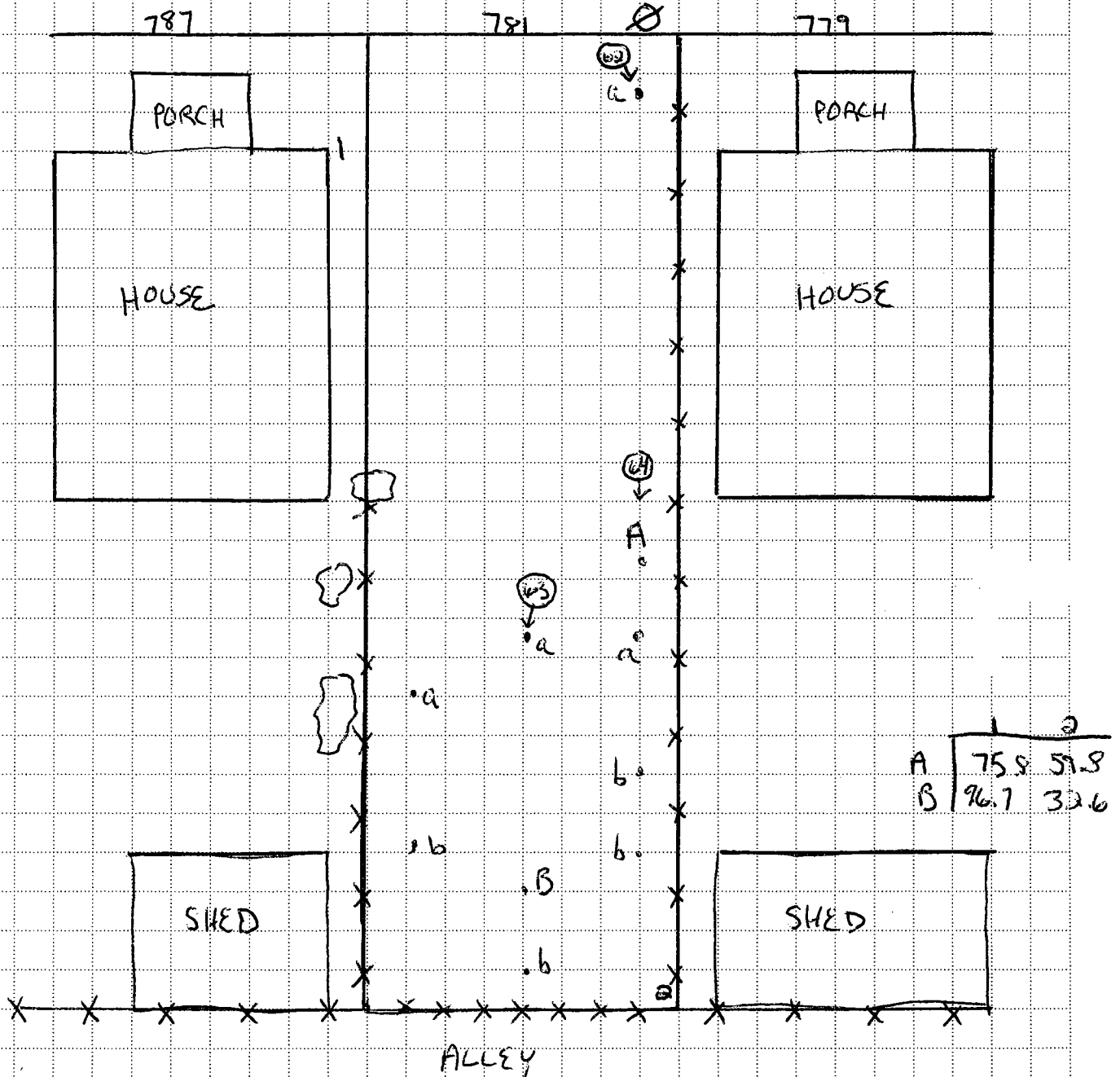
APPROVED BY _____

DEPT _____ DATE _____

Michigan
Ave S

WEST GRAND BLVD

N ←



CLIENT/SUBJECT HUBBARD W.O. NO. _____

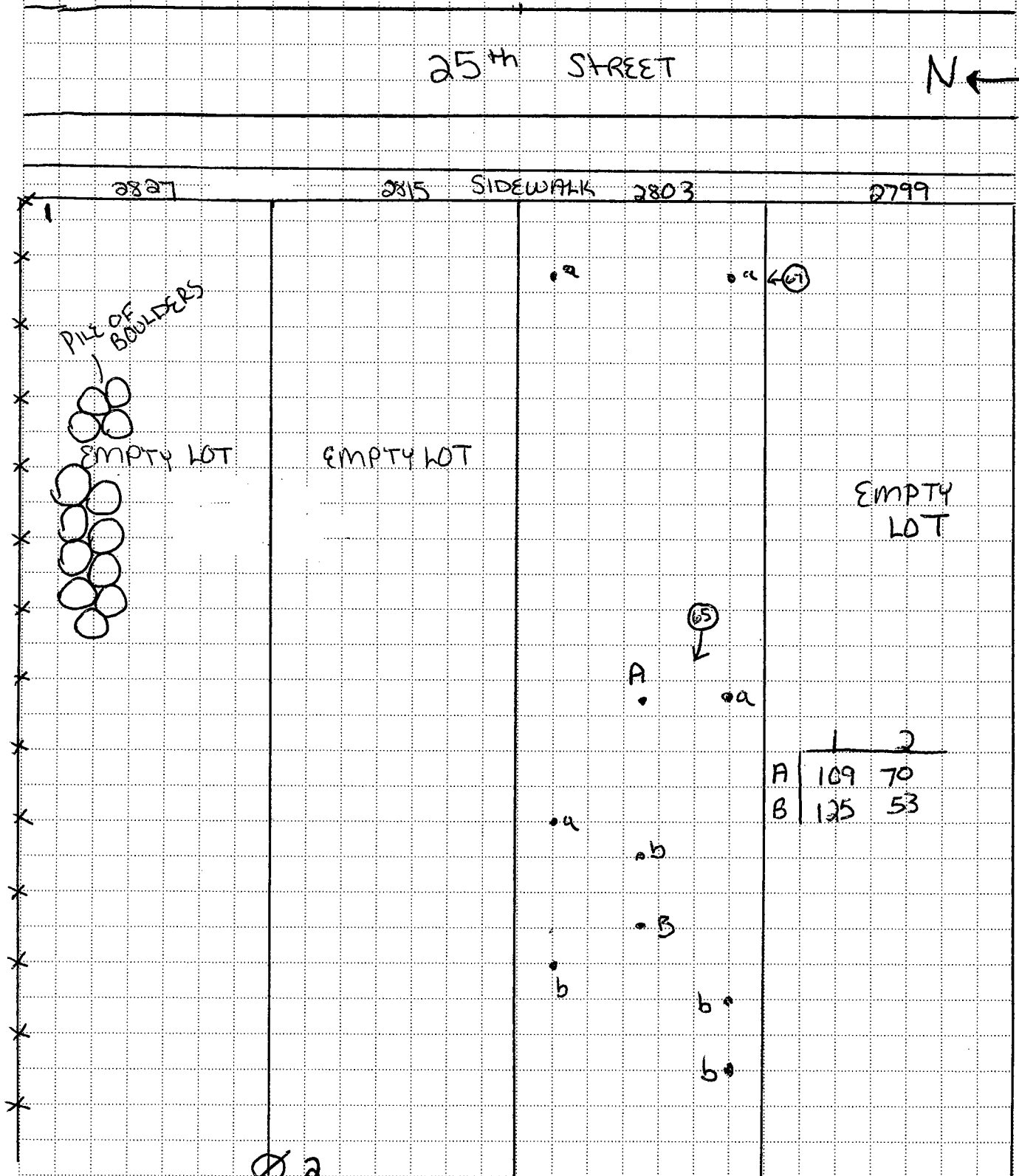
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PREPARED BY A. Freeman DEPT _____ DATE 11-14-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
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DEPT _____	DATE _____



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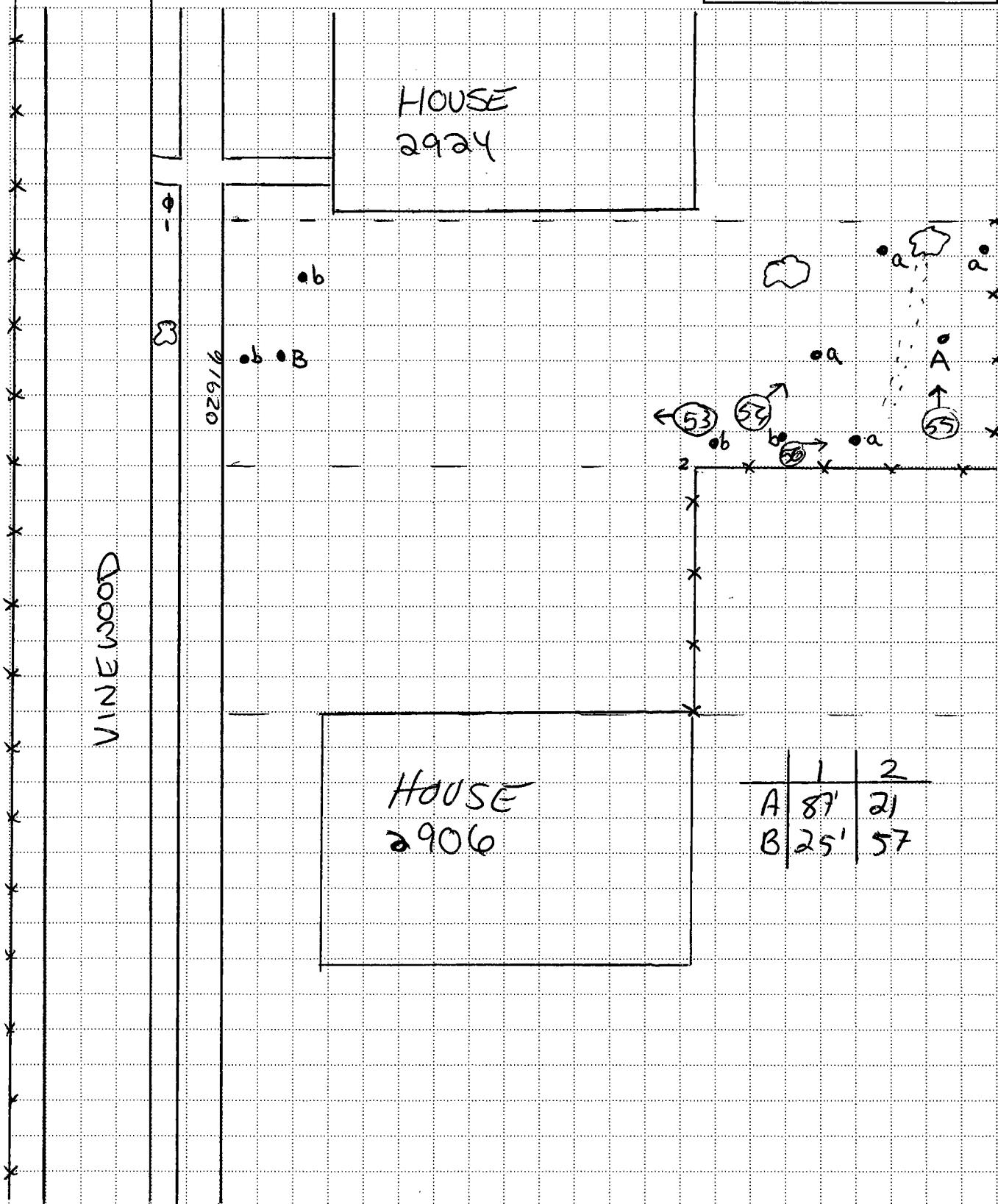
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PREPARED BY R Nemirovsky DEPT _____ DATE 11/14/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



	1	2
A	87'	21
B	25'	57

APPENDIX B
TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
2350 Scotten*	Greenway located on the south side of Brandon St, at the corner of Brandon and Scotten St and to the north of a house at 2344 Scotten.	SCT-02344-A-C-0-1
		SCT-02344-B-C-0-1
4272 Brandon	Greenway located on the northwest side of Brandon St and to the southwest of abandoned house at 4272 Brandon.	BRA-04272-A-C-0-1
		BRA-04272-B-C-0-1
		BRA-04272-C-C-0-1
		BRA-04272-D-C-0-1
4296 Brandon*	Greenway at the corner of Clark St and Brandon St and located northeast of building parking lot called The Idle Group at 2525 Clark.	CLK-02525-A-C-0-1
		CLK-02525-B-C-0-1
4465 Brandon	Greenway located on the southeast side of Brandon St and on the northwest side of two vacant properties.	BRA-04465-A-C-0-1
		BRA-04465-B-C-0-1
2363 Clark*	Greenway located on the corner of Clark and Brandon St and on the northwest side of a fenced in lot belonging to house at 2353 Clark.	CLK-02353-A-C-0-2
		CLK-02353-B-C-0-1
Downwind Properties		
Address	Description	Sample Identification
802 West Grand Blvd	Vacant property located on the east side of W Grand Blvd and to the north side of a house at 796 W Grand Blvd.	WGR-00802-A-C-0-1
		WGR-00802-B-C-0-1
781 West Grand Blvd	Vacant property located on the west side of W Grand Blvd and in between houses at 779 & 787 W Grand Blvd.	WGR-00781-A-C-0-1
		WGR-00781-B-C-0-1
2803 25th Street	Vacant property located on the west side of 25th Street and the third empty lot to the south of a fenced property.	TFH-02803-A-C-0-2
		TFH-02803-B-C-0-1
2798 Roosevelt	Vacant property on the northeast side of Roosevelt St and to the northwest of a house with no marked address which is assumed to be 2788 Roosevelt.	ROO-02798-A-C-0-1
		ROO-02798-B-C-0-1
2822 Roosevelt	Vacant property on the northeast side of Roosevelt St and the fifth empty lot to the northwest of a house with no marked address which is assumed to be 2788 Roosevelt.	ROO-02822-A-C-0-1
		ROO-02822-B-C-0-1
2916 Vinewood	Vacant property located on the northeast side of Vinewood St and to the southeast of a house at 2924 Vinewood.	VIN-02916-A-C-0-1
		VIN-02916-B-C-0-2

*Notes:

- 1) Greenway identifiers were taken from the street the greenway was parallel to and not the actual street to which the property belonged.
- 2) Address used in the sample ID of a greenway was from that of the nearest house.

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration of Lead (mg/Kg)
Upwind		
2350 Scotten	SCT-02344-A-C-0-1	350
2350 Scotten	SCT-02344-B-C-0-1	270
4272 Brandon	BRA-04272-A-C-0-1	490
4272 Brandon	BRA-04272-B-C-0-1	450
4272 Brandon	BRA-04272-C-C-0-1	170
4272 Brandon	BRA-04272-D-C-0-1	430
4296 Brandon	CLK-02525-A-C-0-1	150
4296 Brandon	CLK-02525-B-C-0-1	97
4465 Brandon	BRA-04465-A-C-0-1	280
4465 Brandon	BRA-04465-B-C-0-1	470
2363 Clark	CLK-02353-A-C-0-2	390
2363 Clark	CLK-02353-B-C-0-1	370
Downwind		
802 W Grand Blvd	WGR-00802-A-C-0-1	210
802 W Grand Blvd	WGR-00802-B-C-0-1	230
781 W Grand Blvd	WGR-00781-A-C-0-1	230
781 W Grand Blvd	WGR-00781-B-C-0-1	270
2803 25th Street	TFH-02803-A-C-0-2	110
2803 25th Street	TFH-02803-B-C-0-1	220
2798 Roosevelt	ROO-02798-A-C-0-1	340
2798 Roosevelt	ROO-02798-B-C-0-1	130
2822 Roosevelt	ROO-02822-A-C-0-1	150
2822 Roosevelt	ROO-02822-B-C-0-1	170
2916 Vinewood	VIN-02916-A-C-0-1	220
2916 Vinewood	VIN-02916-B-C-0-2	270

*Notes:

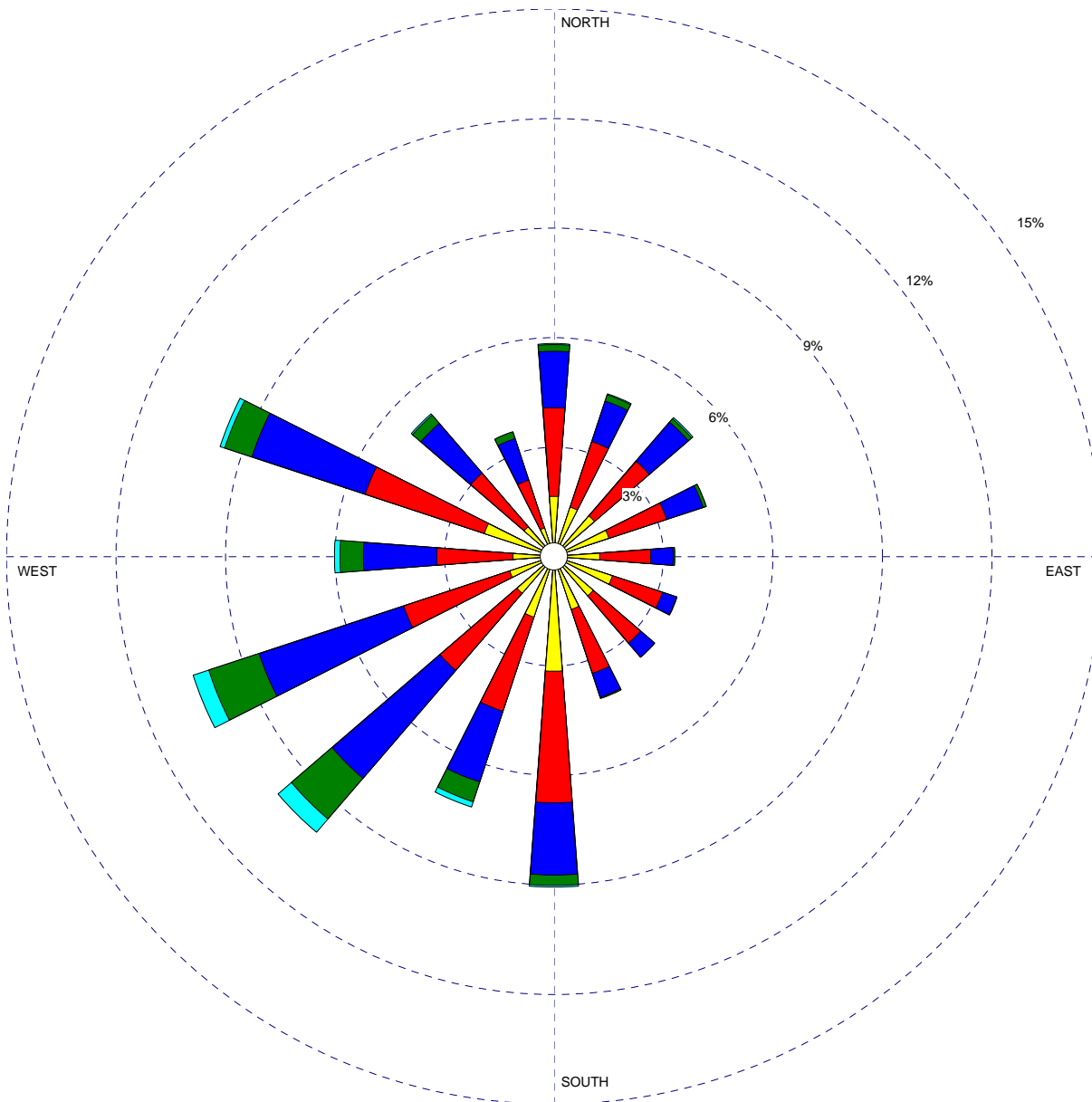
1) Bold indicates results equal to or greater than to 400 mg/kg.

ATTACHMENT C

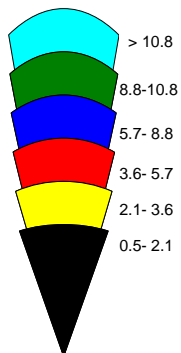
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

Former City Metals Refining – 2945 Hubbard

2344 Scotten – Greenway located on the south side of Brandon St and at the corner of Brandon and Scotten St.

Looking east along greenway at 5 discrete sample A locations.



Looking west along greenway at 5 discrete sample B locations.



Looking west along greenway at the total sampling area.



Hubbard (cont'd)

4272 Brandon – Greenway located on the northwest side of Brandon St and to the southwest of an abandoned house at 4272 Brandon.

Looking northeast along greenway at 5 discrete sample A locations.



Looking southwest along greenway at 5 discrete sample B locations.



Hubbard (cont'd)

4272 Brandon (cont'd)

Looking northeast along greenway at 5 discrete sample C locations.



Looking southwest along greenway at 5 discrete sample D locations.



Looking along the greenway at the total sampling area.



Hubbard (cont'd)

2525 Clark – Greenway located at the corner of Clark St and Brandon St and northeast of a building parking lot called the Idle Group at 2525 Clark.

Looking southeast along greenway at 5 discrete sample A locations.



Looking northwest along greenway at 5 discrete sample B locations.



Looking northwest along greenway at the total sampling area.



Hubbard (cont'd)

4465 Brandon – Greenway located on the southeast side of Brandon St and on the northwest side of two vacant properties.

Looking southwest along greenway at 5 discrete sample A locations.



Looking northeast along greenway at 5 discrete sample B locations.



Looking southeast along the property at the total sampling area.



Hubbard (cont'd)

2353 Clark – Greenway located on the corner of Clark and Brandon St and on the northwest side of a fenced in lot belonging to a house at 2353 Clark.

Looking southwest along greenway at 5 discrete sample A locations.



Looking northeast along greenway at 5 discrete sample B locations.



Looking southwest along the greenway at the total sampling area.



Hubbard (cont'd)

802 West Grand Blvd – Vacant property located on the east side of W Grand Blvd and to the north side of a house at 796 W Grand Blvd.

Looking east along the vacant property at 5 discrete sample A locations.



Looking north along the vacant property at 5 total discrete sample B locations.



Hubbard (cont'd)

781 West Grand Blvd – Vacant property located on the west side of W Grand Blvd and in between houses at 779 & 787 W Grand Blvd.

Looking west along the vacant property at 2 of 5 discrete sample A locations, and 4 of 5 discrete sample B locations further to the west and back of the lot in the photo.



Looking southwest along the vacant property at 1 of 5 discrete sample A locations.



Looking northwest along the vacant property at 2 of 5 discrete sample A locations, and 3 of 5 discrete sample B locations further to the northwest and back of the photo.



Hubbard (cont'd)

2803 25th Street – Vacant property located on the west side of 25th St and the third empty lot to the south of a fenced property.

Looking north along the vacant property at 2 of 5 discrete sample A locations.



Looking west along the vacant property at 3 of 5 discrete sample A locations, and 5 discrete sample B locations further to the west and back of the photo.



Hubbard (cont'd)

2798 Roosevelt – Vacant property on the northeast side of Roosevelt St and to the northwest of a house with no marked address which is assumed to be 2788 Roosevelt.

Looking northeast along the vacant property at 5 discrete sample A locations.



Looking southwest along the vacant property at 5 discrete sample B locations.



Hubbard (cont'd)

2822 Roosevelt - Vacant property on the northeast side of Roosevelt St and the fifth empty lot to the northwest of a house with no marked address which is assumed to be 2788 Roosevelt.

Looking north and east, respectively, along the vacant property at 5 total discrete sample A locations.



Looking west along the vacant property at 5 discrete sample B locations.



Hubbard (cont'd)

2916 Vinewood – Vacant property located on the northeast side of Vinewood St and to the southeast of a house at 2924 Vinewood.

Looking north, northwest, and northeast, respectively, along the vacant property at 5 total discrete sample A locations.

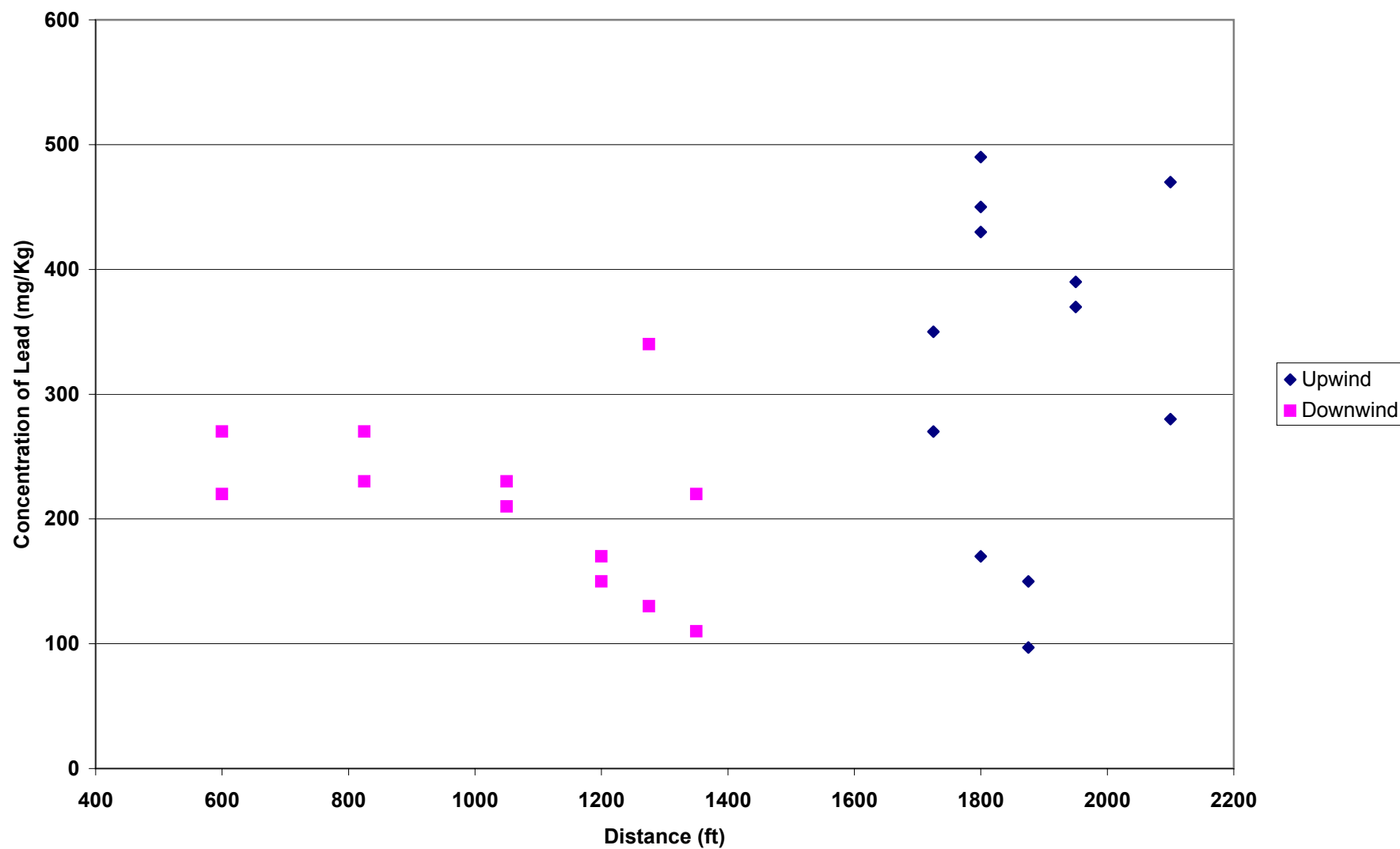


Looking southwest along the vacant property at 5 discrete sample B locations.



ATTACHMENT E
CONCENTRATION GRAPH

2945 Hubbard



City Metals

*** Linear Model ***

Call: lm(formula = Lead.ppm ~ Location + Distance.ft + Distance.ft:Location, data = CityMetals, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-229.4	-51.23	5.811	42.57	170.8

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	146.7292	475.6320	0.3085	0.7609
Location	166.9870	492.4033	0.3391	0.7380
Distance.ft	0.0958	0.2531	0.3786	0.7090
Distance.ft:Location	-0.1922	0.2792	-0.6886	0.4990

Residual standard error: 107.4 on 20 degrees of freedom

Multiple R-Squared: 0.2744

F-statistic: 2.522 on 3 and 20 degrees of freedom, the p-value is 0.08698

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	77862.0	77862.04	6.750918	0.0171918
Distance.ft	1	3920.0	3920.00	0.339878	0.5664158
Distance.ft:Location	1	5468.9	5468.94	0.474176	0.4989827
Residuals	20	230671.0	11533.55		

*** Linear Model ***

Call: lm(formula = Log.Lead ~ Location + Distance.ft + Distance.ft:Location, data = CityMetals, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-1.11	-0.185	0.03244	0.2526	0.6441

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	5.0388	1.9415	2.5954	0.0173
Location	0.8700	2.0099	0.4328	0.6698
Distance.ft	0.0003	0.0010	0.3332	0.7424
Distance.ft:Location	-0.0009	0.0011	-0.8005	0.4328

Residual standard error: 0.4384 on 20 degrees of freedom

Multiple R-Squared: 0.2255

F-statistic: 1.941 on 3 and 20 degrees of freedom, the p-value is 0.1555

Analysis of Variance Table

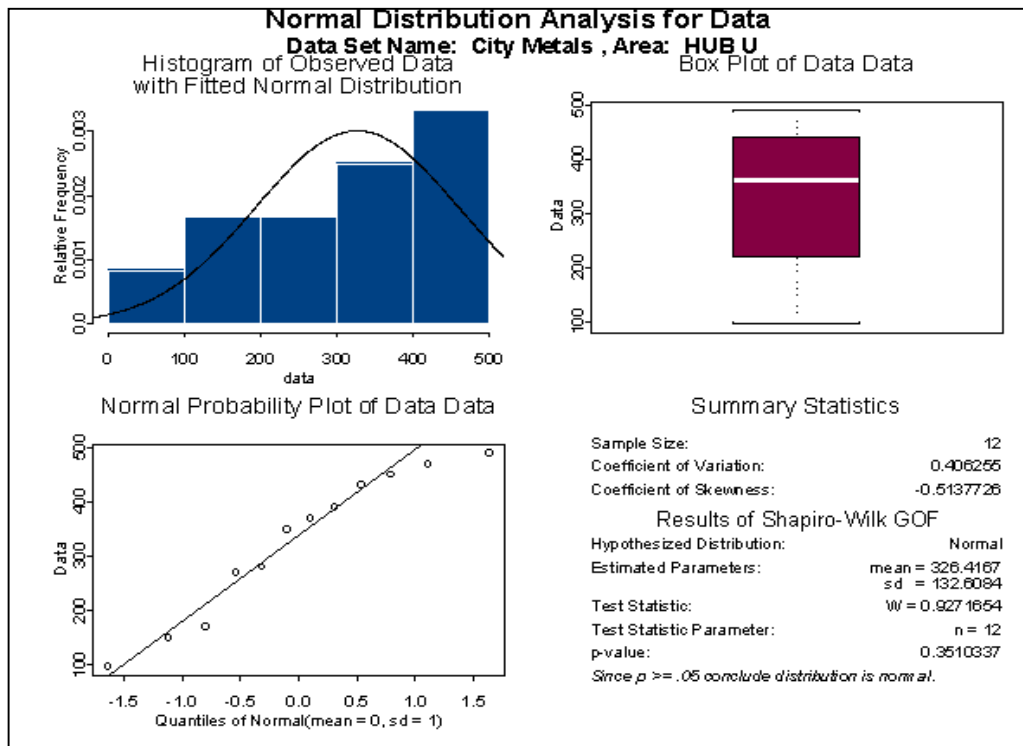
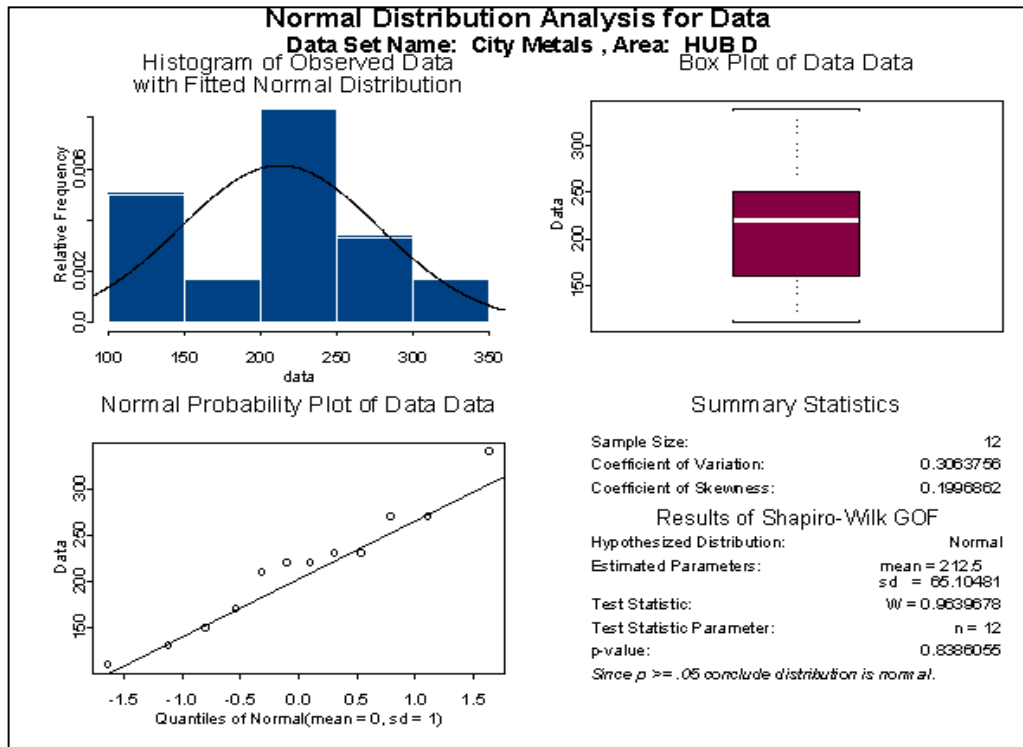
Response: Log.Lead

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	0.829319	0.8293188	4.315665	0.0508589
Distance.ft	1	0.166640	0.1666403	0.867174	0.3628444
Distance.ft:Location	1	0.123131	0.1231312	0.640758	0.4328427
Residuals	20	3.843295	0.1921648		

ATTACHMENT F
STATISTICAL DISTRIBUTION

CITY METALS REFINING STATISTICAL DISTRIBUTION



Appendix J

Aetna Smelting Phase I Summary Report

DRAFT

**PHASE I SUMMARY REPORT
FOR
DETROIT LEAD ASSESSMENT PROJECT
AETNA SMELTING – 1826 ILLINOIS STREET
DETROIT, WAYNE COUNTY, MICHIGAN**

Prepared for:

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
REMEDATION AND REDEVELOPMENT DIVISION**

Detroit Field Office – Cadillac Place

Suite 2-300

3058 West Grand Boulevard

Detroit, Michigan 48202

Prepared by:

WESTON SOLUTIONS OF MICHIGAN, INC.

2501 Jolly Road

Suite 100

Okemos, Michigan 48864

February 2004

W.O. No. 20083.028.001

EXECUTIVE SUMMARY

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Aetna Smelting Company (the Facility), 1826 Illinois Street, Detroit, Wayne County, Michigan.

The presence of lead identified on properties adjacent to or nearby the Facility, was evaluated against predominant atmospheric conditions, spatial distribution and statistical analysis to determine if the lead at the adjacent or nearby properties was indicative of aerial deposition from the Facility.

On 17 and 19 November 2003, WESTON collected 24 soil samples for lead analysis at locations upwind and downwind of the Facility. Review of the data concluded that the lead found was consistent with deposition resulting from aerial releases and suggests that such releases occurred during historic smelting operations at the Facility. As a result of this finding, additional work is recommended to provide additional data required to evaluate the offsite conditions. This work consists of collecting soil samples from additional properties located within 1,000 feet downwind of the Facility.

If the results of that effort supported the conclusion that downwind deposition did occur and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning):
- Interview past employees regarding historical Facility operations;
- Perform a Facility walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

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LIST OF ATTACHMENTS

Title

Attachment A	Figures
Attachment B	Tables
Attachment C	Wind Rose Plot
Attachment D	Photographs of Sampling Locations
Attachment E	Concentration Graph
Attachment F	Statistical Distribution

SECTION 1

INTRODUCTION

Weston Solutions of Michigan, Inc. (WESTON®) was contracted by the Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) to conduct off-site sampling for the Detroit Lead Assessment Project (the Project) in Detroit, Wayne County, Michigan. This summary report addresses sampling that was conducted in the vicinity of the former Aetna Smelting Company (the Facility), 1826 Illinois Street, Detroit, Wayne County, Michigan. The overall objectives, technical basis, and general sampling protocols of this work are described in the *Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project* (Comprehensive Summary).

1.1 SUMMARY REPORT FORMAT

This Summary Report has been organized in a format that is intended to facilitate and effectively meet the objectives of the Phase I investigation. The Summary Report is organized into the following sections:

- **Section 1** – Introduction,
- **Section 2** – Site Information,
- **Section 3** – Field Activities and Procedures,
- **Section 4** – Phase I Analytical Results, and
- **Section 5** – Recommendations.

Attachments to this Sampling Report include the following:

- **Attachment A** – Figures,
- **Attachment B** – Tables,
- **Attachment C** – Wind Rose Plot,
- **Attachment D** – Photographs of Sampling Locations,
- **Attachment E**– Concentration Graph, and
- **Attachment F** – Statistical Distribution.

SECTION 2

SITE INFORMATION

2.1 SITE DESCRIPTION

The Facility, located at 1826 Illinois Street in Detroit, Wayne County Michigan (Detroit Metropolitan Area), was suspected of historical smelting operations and was chosen for investigation by the MDEQ based on its presence on a nationwide list of potential lead smelters. WESTON performed a preliminary records review including review of Bresser’s city directory information, Sanborn fire insurance maps, aerial photographs, Fire Marshall inspection/permit records, and Baseline Environmental Assessments (BEAs). This review, presented in the “*Summary Report for Data Investigation, Detroit Lead Assessment Project*” dated September 2003, concluded that the facility required additional investigation. Facility location maps are included in **Attachment A**. The addresses of off-site properties sampled are presented in **Table 1** located in **Attachment B**.

2.1.1 Site Location

The Facility appears to be located at the site of the current Pepsi Bottling Distributor facility parking lot. The area north and south of the Facility is industrial. The area east of the Facility is industrial for three blocks and residential for at least the next two blocks. A city scrap metal yard is located immediately east of the Facility. The area five blocks west of the Facility is industrial primarily the Pepsi facility and Interstate 75 (I-75). A senior living complex is located between the Pepsi facility and I-75.

2.1.2 Site History

A review of the Bresser’s city directory indicated that Aetna Smelting and Refining Company owned the property from 1946 to 1971. The address is not listed from 1981 to the present.

Review of the Sanborn maps for this address show the following chronology: 1921 National Smelter Refining Company present with two metal sheds; 1950 Aetna Smelter Company present with a warehouse and metal staging areas; 1968 Aetna Smelter Company present; 1977 Aetna

Smelter Company demolished; 1982 building demolished; 1986 property is cleared; 1996 to 2002 property under the Pepsi Distributing and Production Center.

The aerial photograph review indicated this area was industrialized from 1957 to the present with sparse residential use beginning approximately 1,500 feet (ft.) east of the address. Structures were not identified from the most recent aerial photograph (2003 GlobeXplorer™) with the historical address no longer in use, and the lot paved over for parking next to a large building just to the north. Review of the drive by information indicates that land use is consistent with the aerial photograph and Sanborn maps.

During the investigation of the fire records, an application for the installation of an Inflammable Liquid Storage Tank was located with its nature of business being described as melting of white metals (a classification which includes white lead, white lead ore, and cerussite). A permit was issued to repair fire damage and replace a defective steel stack in the junkyard and smelting plant.

BEAs for the property or surrounding properties was not found.

2.2 SITE CONCERNS

The primary concern associated with the Facility is the off-site release of smelter related metals, specifically lead, to soils in the surrounding neighborhood through aerial deposition.

SECTION 3

FIELD ACTIVITIES AND PROCEDURES

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The goal of the Phase I sampling was to determine if lead concentrations consistent with smelter-related releases were present off-site and could be attributed to the former Facility. The general sampling protocol presented in **Section 2** of the Comprehensive Summary was followed during the Phase I evaluation of the Facility. Due to the development around the Facility, samples could not be collected within the 1,000 foot radius stated in the Quality Assurance Sampling Plan (QASP), so the radius was increased for the Facility.

Prior to sample collection, upwind and downwind sampling areas were established, 2,700 and 1,500 ft. from the Facility, respectively. These areas were established based on mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. Soil samples were collected from city and/or state owned properties located within these established areas.

The city and/or state owned parcels identified for sampling were those closest to the average wind direction and at varying distances from the Facility. Where individual city and/or state owned parcels were not available, rights-of-way, utility corridors, and alleyways ('greenways') were used and have been identified on the figures included in **Attachment A**. Photographs of the sampling locations have been included in **Attachment D**. Exposure units and appropriate sample grids were established in accordance with the QASP to guide the sampling activities.

3.1.1 Sampling Approach

Sampling activities (sample collection, record keeping, and photo documentation) were conducted as described in the “*Comprehensive Phase I Sampling Summary Report for the Detroit Lead Assessment Project*”. City and/or State owned parcels were available in the sample radius for the Facility so WESTON collected samples from 7 parcels near the Facility. Six City and/or State owned parcels were sampled in the downwind direction and one large parcel was

sampled in the upwind direction due to size and availability of the properties. Two composite samples were collected from each of the 6 downwind parcels. Twelve composite samples were collected from the large upwind parcel (large parcel of land encompassed approximately six average sized parcels. A total of 24 composite samples were collected from the area upwind and downwind of the Facility and are shown on the sample sketches included in **Attachment A**.

3.2 FIELD ACTIVITIES

WESTON personnel, Ms. Rebecca Nemirovsky and Ms. Amanda Freeman, conducted field sampling on 17 and 19 November 2003. City and/or state owned parcels were sampled, and were noted in the logbook and can be viewed on the “Summary Table For Sample Properties” (**Attachment B**) and the sample sketches (**Attachment A**). WESTON collected samples from one upwind parcel for a total of 12 composite samples. Additionally, two samples were collected from each of the six downwind parcels for a total of 12 downwind samples. Twenty four soil samples were submitted for analysis. Five samples were designated as a matrix spike/matrix spike duplicates (MS/MSD) in accordance with the QASP.

SECTION 4

PHASE I ANALYTICAL RESULTS

4.1 SUMMARY OF ANALYSIS

During Phase I soil sampling the following samples were collected from the Facility project area:

- 12 composite soil samples in the upwind direction, and
- 12 composite soil samples in the downwind direction.

Sample locations from both the upwind and downwind areas are listed in **Table 1** included in **Attachment B**.

In accordance with the QASP, a total of 24 samples were sent to the State Laboratory located in Lansing, Michigan for analysis via United States Environmental Protection Agency (U.S. EPA) Method 6010 for lead. Samples collected from properties upwind of the Facility did not contain concentrations of lead above the project screening level (400 milligrams per kilogram [mg/kg]) established in the Phase I QASP. Two samples collected from properties downwind of the former facility contained concentrations of lead above the project screening level (400 mg/kg) established in the Phase I QASP. A summary of the Phase I sample results is included in the table below.

Phase I Summary of Results

Location	Number of Samples	Number equal or greater than 400 mg/kg	Range of Values (mg/kg)
Upwind	12	0	43-370
Downwind	12	2	170-470
Total	24	2	43-470

4.2 ATMOSPHERIC CONDITIONS

During Phase I soil sampling activities, upwind and downwind parcels were selected based on the mean wind direction from 1984 to 1991 for the Detroit Metropolitan Area. A copy of the wind rose plot is provided in **Attachment C**. The wind rose plot showed a prominent northeast wind direction in the City of Detroit Metropolitan Area. If smelting operations occurred, lead in soil resulting from aerial deposition would be detected downwind in the northeast direction from the Facility. Parcels ranging from 2,300 ft. to 2,700 ft. were selected southwest in the upwind direction from the Facility. Parcels ranging from 900 ft. to 1,500 ft. were selected northeast, as close to the mean downwind direction from the Facility due to the presence of residential properties. Elevated lead concentrations were found in the downwind direction of the Facility and low-level lead concentrations (<400 mg/kg) were detected in the upwind direction. A detailed analysis of upwind and downwind concentrations is contained in **Section 4.3 Spatial Analysis**.

4.3 SPATIAL ANALYSIS

Where air-transport of materials occurs, it is expected that the largest impacts on the soil will occur closest to the source, and the magnitude of the impact will tend to decrease as a function of distance from the source. In addition, it is expected that the spatial pattern of soil impacts will tend to be elongated in the predominant downwind direction. Thus the Phase I investigation was designed to determine if an off-site airborne release had occurred by examining the spatial pattern of soil contaminant concentrations as a function of distance from the source in a downwind direction. As seen in **Figure 2 (Attachment A)**, concentrations of lead greater than the screening level occurs within the primary downwind envelope.

To determine the distribution of the lead concentrations in soils as the distance from the Facility increases, WESTON evaluated the lead concentration of samples versus the distance from the facility by graphing the data in relation to each other. Evaluation of this graph (**Attachment E**) indicated consistently low concentrations of lead in the upwind direction and higher levels of lead in the downwind direction represented as decreasing concentrations with increasing distance from the Facility. Even though only two of the downwind samples contained lead above the

screening level (400 mg/kg), the decreasing concentration trend is a condition that would be expected if an aerial release of lead had occurred due to smelting operations. These conclusions were confirmed by a linear regression of the concentrations versus distance data (**Attachment E**).

4.4 STATISTICAL ANALYSIS

Analytical data was entered into a spreadsheet and differentiated as downwind and upwind samples, then processed using the MDEQ online statistical interface for Part 201 evaluations. As shown on the distribution analysis figures included in **Attachment F**, the downwind mean is 325 mg/kg and the upwind mean is 189 mg/kg indicating the concentrations downwind are greater than the upwind concentrations. In addition, the relative frequency for the downwind data shows a larger variation across the sample set than the upwind which contains a more even distribution. Comparison of the upwind and downwind data sets indicates the lead concentrations are sufficiently different from each other both in mean concentration and distribution to conclude that the data represent separate conditions.

4.5 CONCLUSIONS

The pattern of analytical results for lead in soil samples collected for the Facility suggests that lead contamination detected in downwind locations may be attributable to historic releases from historic smelting operations at the Facility. The analytical data was compared to a screening level consisting of the MDEQ Residential and Commercial I Direct Contact Criteria for soils, as established under Part 201 Environmental Response of the Natural Resources and U.S. EPA 1994, as amended.

None of the samples collected from upwind of the Facility contained concentrations of lead above the 400 mg/kg screening level. The downwind samples indicate a trend of decreasing concentration with increasing distance. However only 2 samples (not those closest to the Facility) exceed the screening level. Lead concentrations upwind of the Facility are below the screening level and lead concentrations downwind exceed the screening levels and exhibit a decrease in concentration with increasing distance from the Facility. This pattern is consistent

with deposition resulting from aerial releases and suggests that such releases occurred from the Site during historic smelting operations at the Facility.

SECTION 5

RECOMMENDATIONS

5.0 RECOMMENDATIONS

Based on the evaluation of the Phase I analytical data, it is recommended that additional tasks be completed to further define the risk and the origin of the off site contamination. The determination that additional work is necessary is based on two factors:

- The presence of residential receptors located within approximately 600 feet downwind of the Facility,
- The pattern of lead concentrations within the study area suggests a strong potential that soils at downwind properties have been impacted by aerial deposition from releases of lead from historic smelting operations at the Facility.

To be certain that the conclusions are based on enough data it is recommended that additional soil samples be collected from additional properties located within 1,000 feet downwind of the Facility.

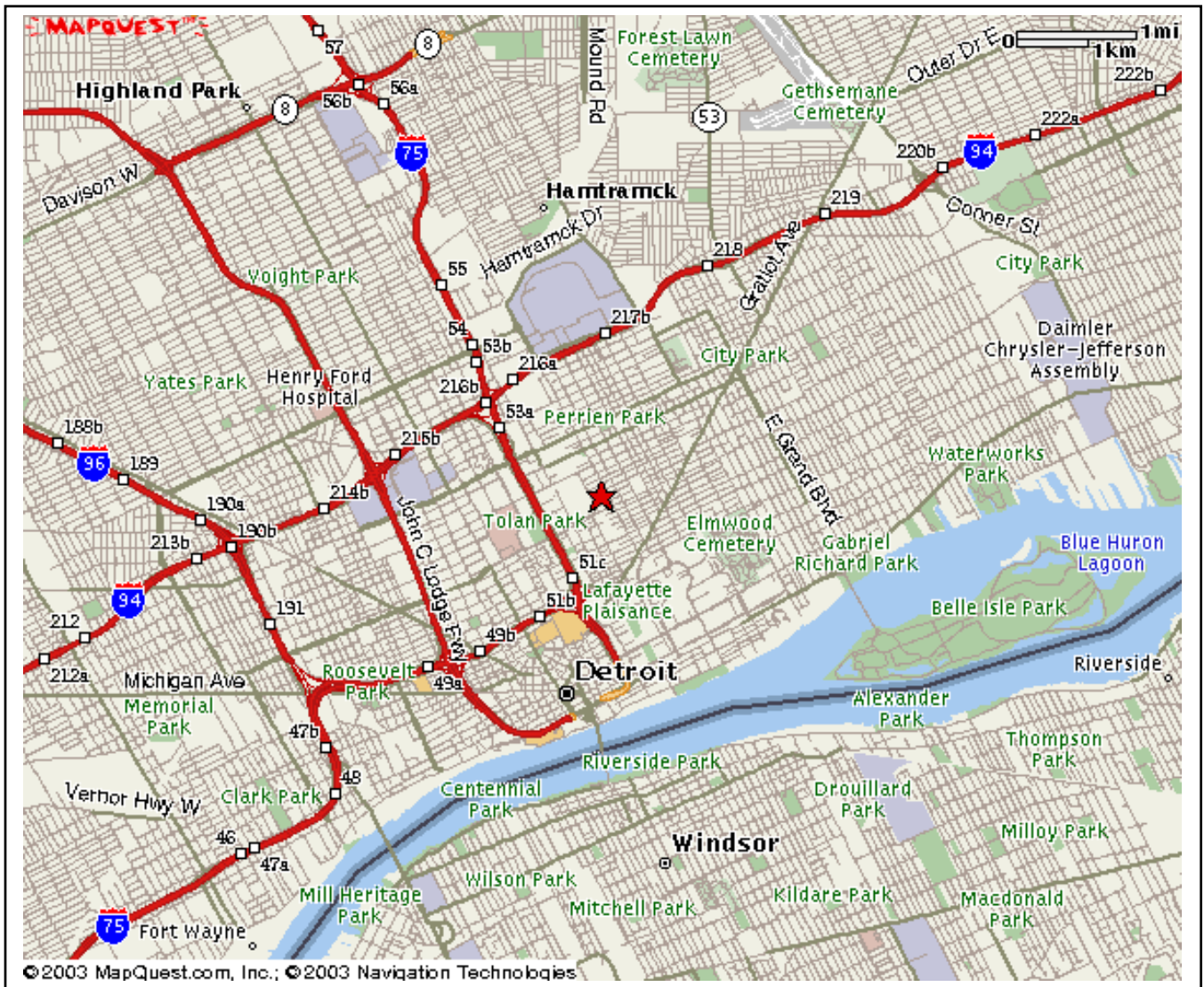
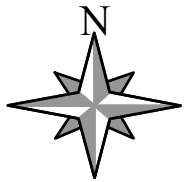
If the results of that effort supported the conclusion that downwind deposition occurred and that levels of lead found were above the screening level then additional recommendations would consist of obtaining access to the suspected source property for:

- Review of existing information related to property transfer (Phase I, Phase II, and development planning);
- Interview past employees regarding historical Facility operations;
- Perform a Facility walk to determine existing conditions;
- Collect on-site soil samples to determine the presence, concentration, and extent of lead on the Site (related to the location of former structures, if possible).

ATTACHMENT A

FIGURES

FIGURE 1
Site Location Map
1826 Illinois Street

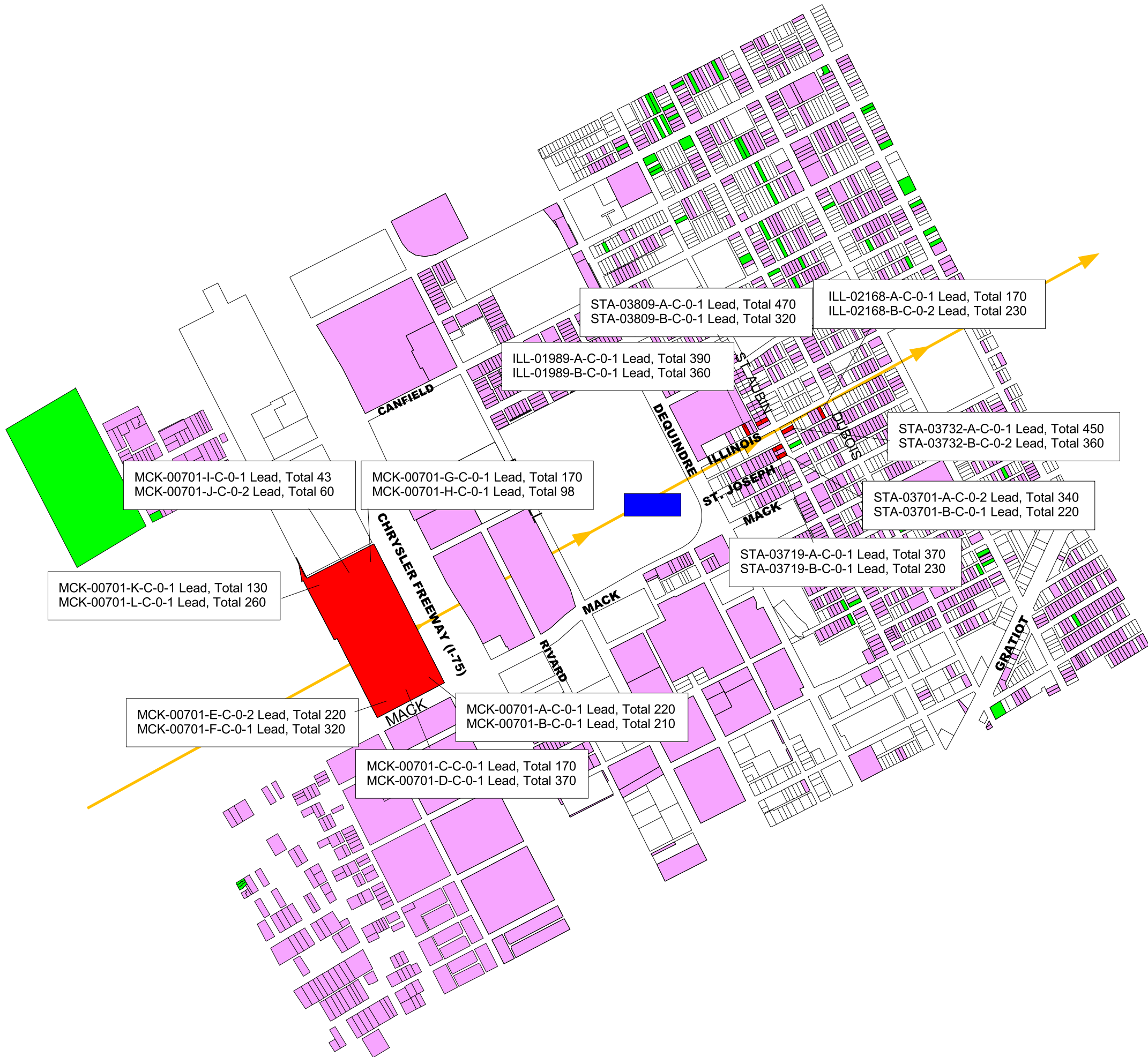


WESTON SOLUTIONS, INC. OF MICHIGAN



300 River Place, Suite 2800
Detroit, Michigan 48207

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan
W.O. No. 20083.028.001



LEGEND:

EXAMPLE:

MWK-02525-A-C-0-1 Lead, Total 170

Sample ID Constituent Result

Parcel Boundaries
Sampled Properties
Facility of Concern
State Owned Property
City Owned Property
Wind Direction

Note: All Lead, Total analytical results are shown in mg/kg.

N

0 800 Feet



PROJECT NAME:

Detroit Lead Assessment Project
Detroit, Wayne County, Michigan

Weston Solutions, Inc. of Michigan
300 River Place
Suite 2800
Detroit, Michigan 48207

DRAWING TITLE:

Analytical Results Map

Aetna Smelting
1826 Illinois Street

WORK ORDER No.: 20083.028.001	PROJECT MANAGER:
DRAWN BY: JLT	CHECKED BY:
DRAWING NAME:	DIRECTORY/ FOLDER: JLT/D:\DLAP\apr09_09_03.apr
CONTRACT No.:	DELIVERY ORDER No.:
SCALE:	REPORT DATE:
DATE: January 2004	REVISION No.:
	FIGURE No.: 2

ATTACHMENT B

TABLES

TABLE 1
SUMMARY OF SAMPLED PROPERTIES

Upwind Properties		
Address	Description	Sample Identification
701 Mack (Southeast end of Edward Tolan Playfield & directly northeast of Crockett Technical High School)	Property located on the corner of Chrysler Dr and Mack. Area surrounding the slide and between the monkey bars were used.	MCK-00701-A-C-0-1
		MCK-00701-B-C-0-1
701 Mack	Property located on the corner of Chrysler Dr and Mack. Area to the northeast of the baseball diamond was used.	MCK-00701-C-C-0-1
		MCK-00701-D-C-0-1
701 Mack	Property located on the corner of Chrysler Dr and Mack. Area to the south west of the baseball diamond was used.	MCK-00701-E-C-0-2
		MCK-00701-F-C-0-1
701 Mack (Northwest end of Edward Tolan Playfield)	Property located on the southwest side of Chrysler Dr. Area farthest to the east was used.	MCK-00701-G-C-0-1
		MCK-00701-H-C-0-1
701 Mack	Property located on the southwest side of Chrysler Dr. Area directly between the east and west sampling areas were used.	MCK-00701-I-C-0-1
		MCK-00701-J-C-0-2
701 Mack	Property located on the southwest side of Chrysler Dr. Area farthest to the west was used.	MCK-00701-K-C-0-1
		MCK-00701-L-C-0-1
Downwind Properties		
Address	Description	Sample Identification
2168 Illinois	Vacant property located on the southeast side of Illinois St and to the northeast of a house at 2162 Illinois.	ILL-02168-A-C-0-1
		ILL-02168-B-C-0-2
1989 Illinois	Vacant property located on the northwest side of Illinois St and on the northeast side of a fence lined with scrubs/trees.	ILL-01989-A-C-0-1
		ILL-01989-B-C-0-1
3809 St Aubin	Vacant property located on the southwest side of St Aubin and directly northwest of an unpaved parking lot on the corner of St Aubin & Illinois.	STA-03809-A-C-0-1
		STA-03809-B-C-0-1
3701 St Aubin	Vacant property located on the corner of St Aubin and St Joseph.	STA-03701-A-C-0-2
		STA-03701-B-C-0-1
3719 St Aubin	Vacant property located on the southwest/west side of St Aubin and to the south of the Lumber & Millwork Company at 3741 St Aubin.	STA-03719-A-C-0-1
		STA-03719-B-C-0-1
3732 St Aubin	Vacant property located on the northeast side of St Aubin and directly southeast of a house.	STA-03732-A-C-0-1
		STA-03732-B-C-0-2

TABLE 2
ANALYTICAL RESULTS

Sample Address	Sample ID	Concentration (mg/Kg)
Upwind		
701 Mack	MCK-00701-A-C-0-1	220
701 Mack	MCK-00701-B-C-0-1	210
701 Mack	MCK-00701-C-C-0-1	170
701 Mack	MCK-00701-D-C-0-1	370
701 Mack	MCK-00701-E-C-0-2	220
701 Mack	MCK-00701-F-C-0-1	320
701 Mack	MCK-00701-G-C-0-1	170
701 Mack	MCK-00701-H-C-0-1	98
701 Mack	MCK-00701-I-C-0-1	43
701 Mack	MCK-00701-J-C-0-2	60
701 Mack	MCK-00701-K-C-0-1	130
701 Mack	MCK-00701-L-C-0-1	260
Downwind		
2168 Illinois	ILL-02168-A-C-0-1	170
2168 Illinois	ILL-02168-B-C-0-2	230
1989 Illinois	ILL-01989-A-C-0-1	390
1989 Illinois	ILL-01989-B-C-0-1	360
3809 St Aubin	STA-03809-A-C-0-1	470
3809 St Aubin	STA-03809-B-C-0-1	320
3701 St Aubin	STA-03701-A-C-0-2	340
3701 St Aubin	STA-03701-B-C-0-1	220
3719 St Aubin	STA-03719-A-C-0-1	370
3719 St Aubin	STA-03719-B-C-0-1	230
3732 St Aubin	STA-03732-A-C-0-1	450
3732 St Aubin	STA-03732-B-C-0-2	360

***Notes**

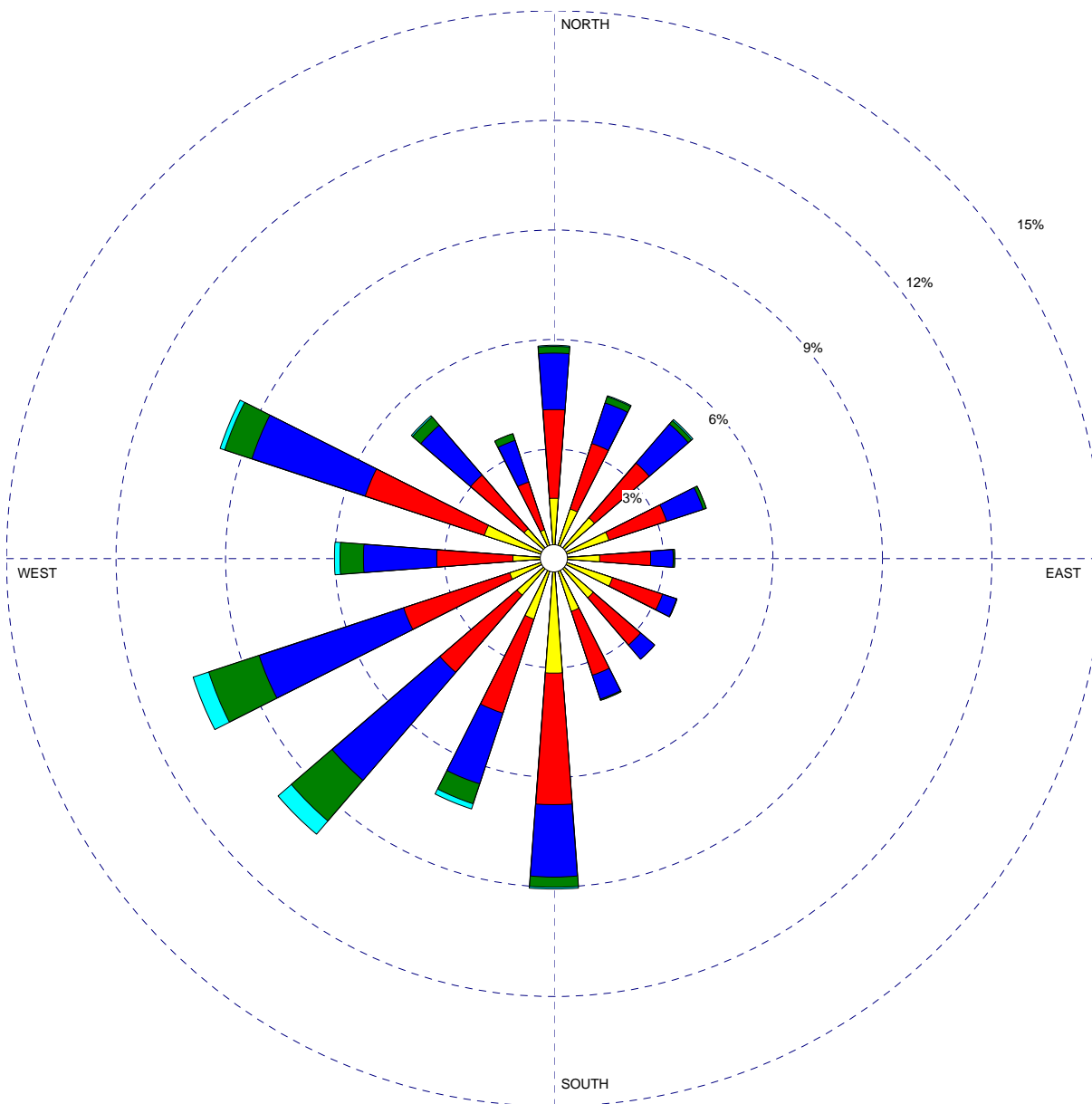
- 1) Bold indicates results equal to or greater than 400 mg/kg.

ATTACHMENT C

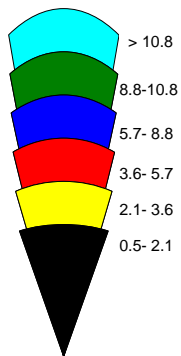
WIND ROSE PLOT

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C

ATTACHMENT D
PHOTOGRAPHS OF SAMPLING LOCATIONS

CLIENT/SUBJECT ILLINOIS W.O. NO. _____

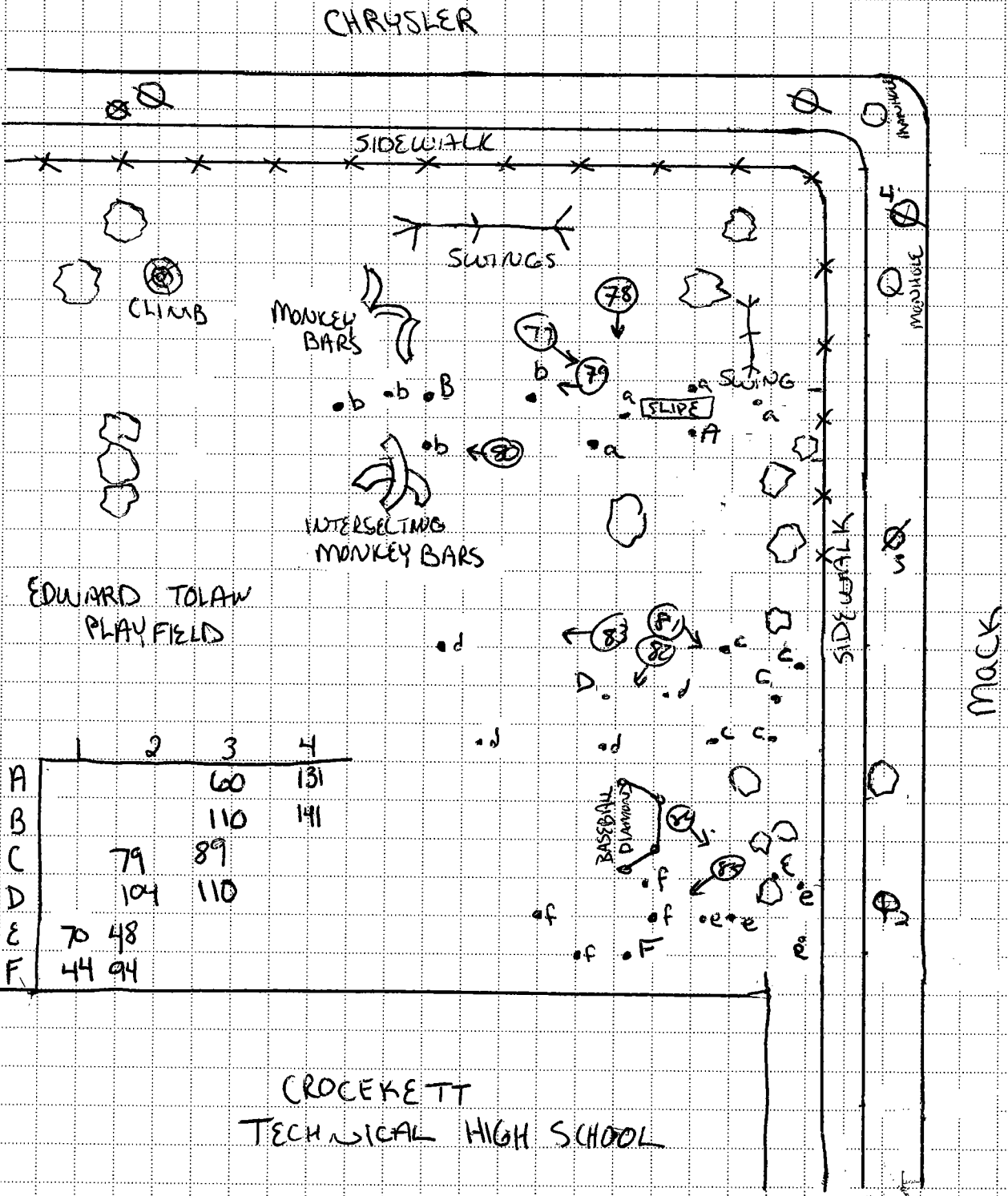
TASK DESCRIPTION MCK-00701 A+B+C+D+E+F TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-17-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



EDWARD TOLAW
PLAY FIELD

	1	2	3	4
A			60	131
B			110	141
C		79	89	
D		104	110	
E	70	48		
F	44	94		

CROCKETT
TECHNICAL HIGH SCHOOL

CLIENT/SUBJECT ILLINOIS

W.O. NO. ____

TASK DESCRIPTION 701 MACK AVE G.H.I.J.K.L

TASK NO. ____

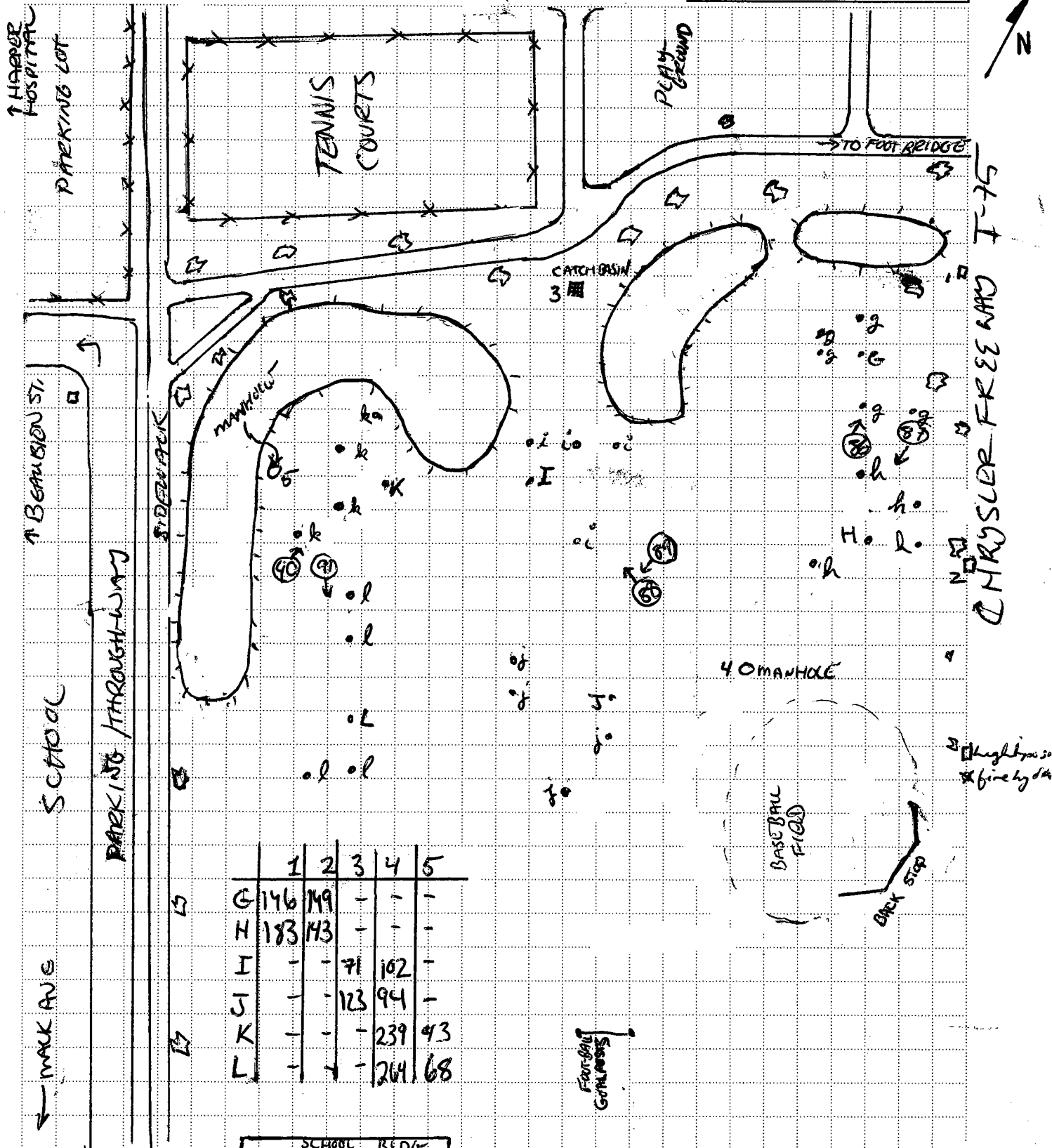
PREPARED BY R. Nemirsky DEPT NORTH DATE 11/19/03

APPROVED BY

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

DEPT ____ DATE ____



CLIENT/SUBJECT ILLINOIS

W.O. NO. _____

TASK DESCRIPTION ILL-02168 A+B

TASK NO. _____

PREPARED BY R. Nemirovsky DEPT _____

DATE 11/17/03

APPROVED BY _____

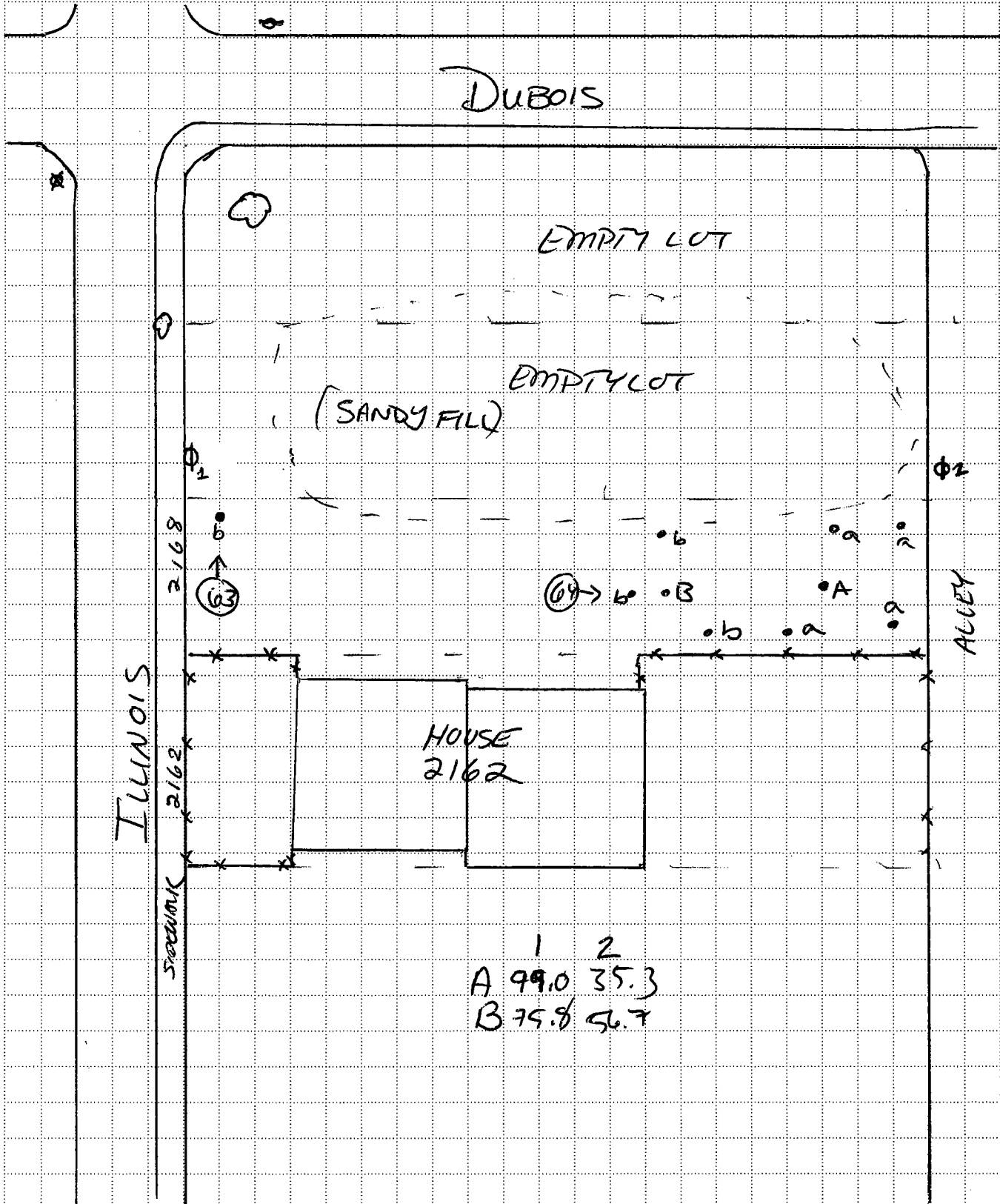
MATH CHECK BY _____ DEPT _____

DATE _____

METHOD REV. BY _____ DEPT _____

DATE _____

DEPT _____ DATE _____



CLIENT/SUBJECT ILLINOIS W.O. NO. _____

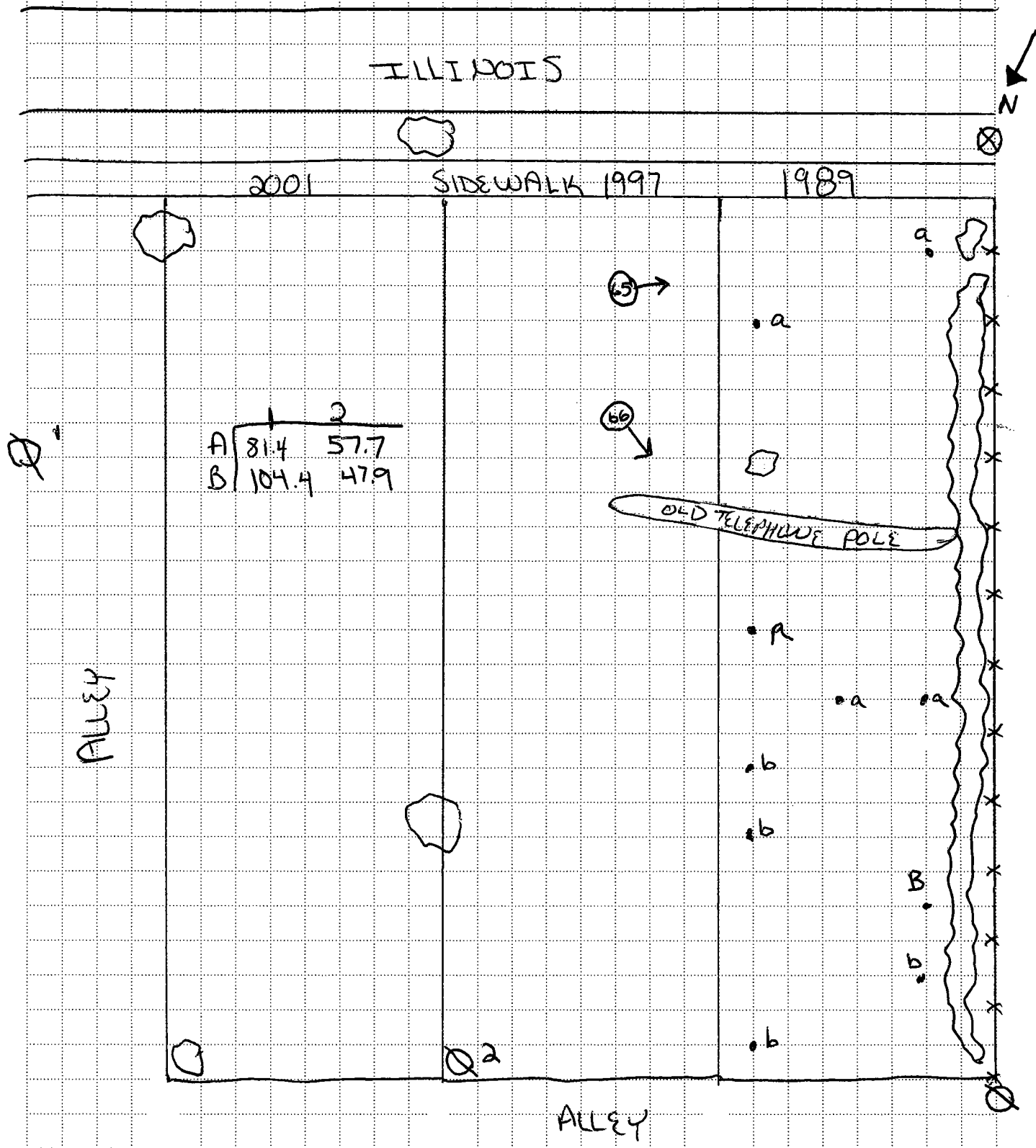
TASK DESCRIPTION ILL-01989 A+B TASK NO. _____

PREPARED BY A Freeman DEPT _____ DATE 11-17-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>	
DEPT _____	DATE _____



CLIENT/SUBJECT ILLINOIS W.O. NO. _____

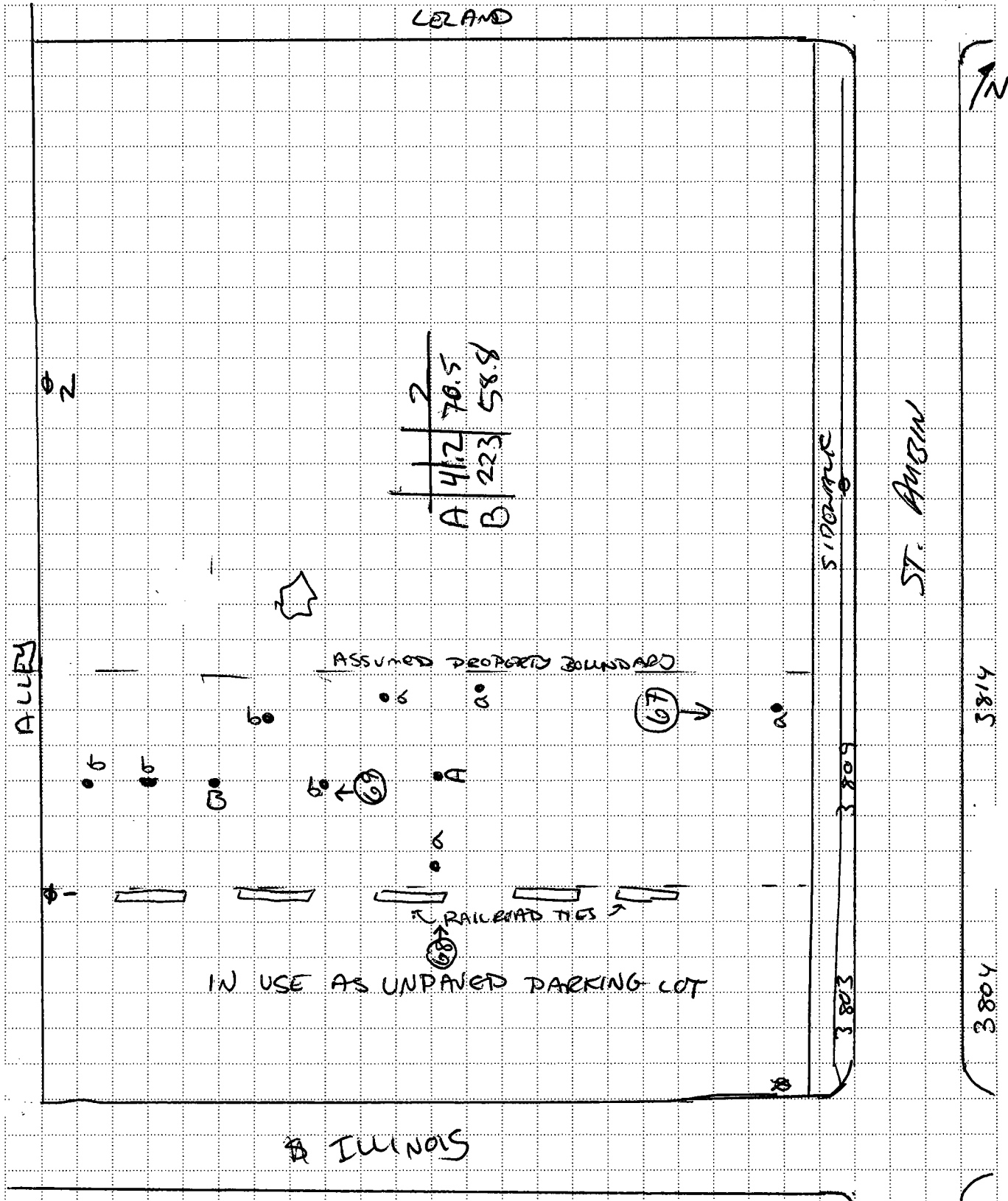
TASK DESCRIPTION STA-03809 A+B TASK NO. _____

PREPARED BY R. NEMIROVSKY DEPT _____ DATE 11/17/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT ILLINOIS W.O. NO. _____

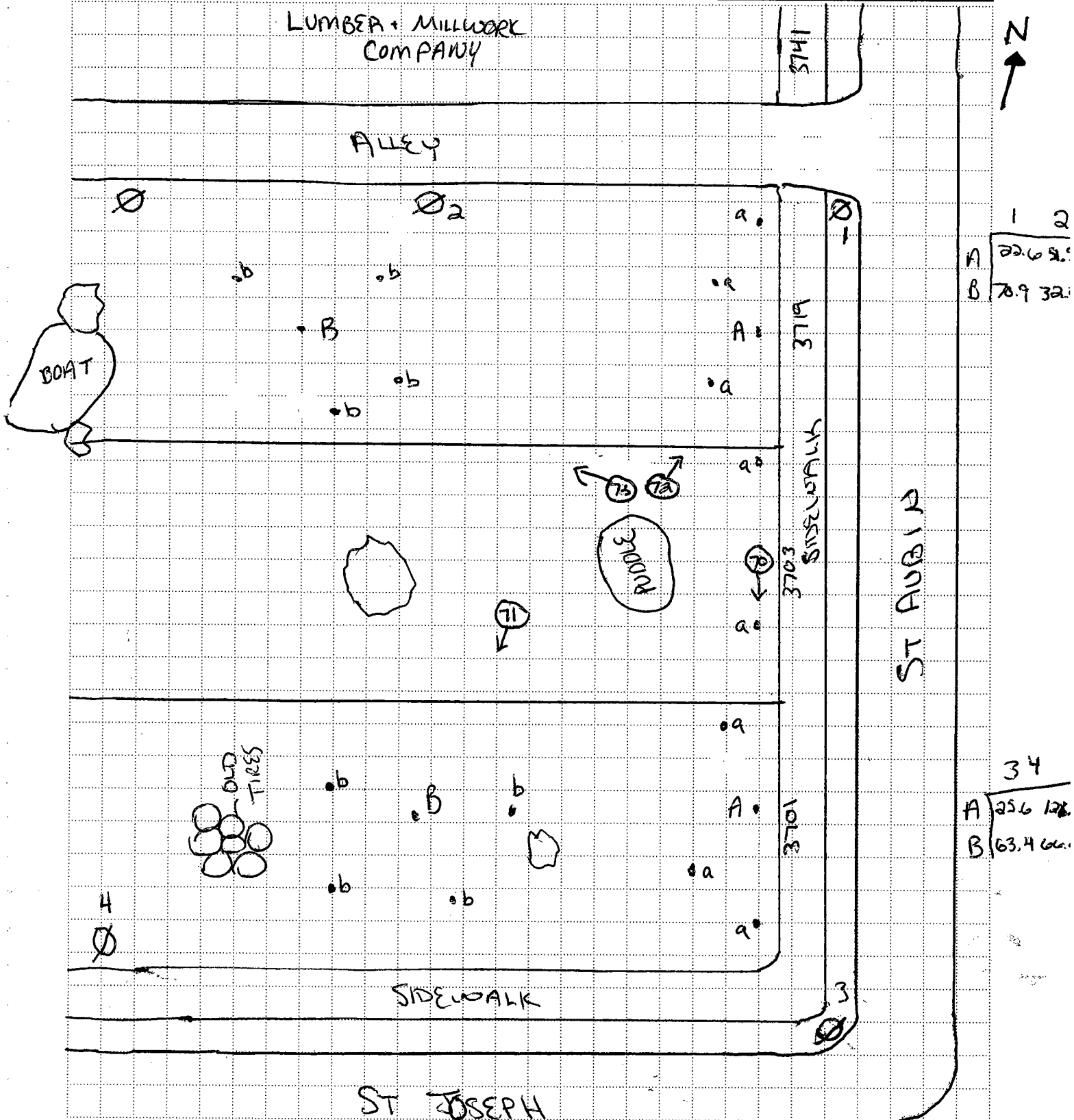
TASK DESCRIPTION STA-03701 A+B STA-03719 A+B TASK NO. _____

PREPARED BY A. Freeman DEPT _____ DATE 11-17-03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
DEPT _____	DATE _____



CLIENT/SUBJECT ILLINOIS W.O. NO. _____

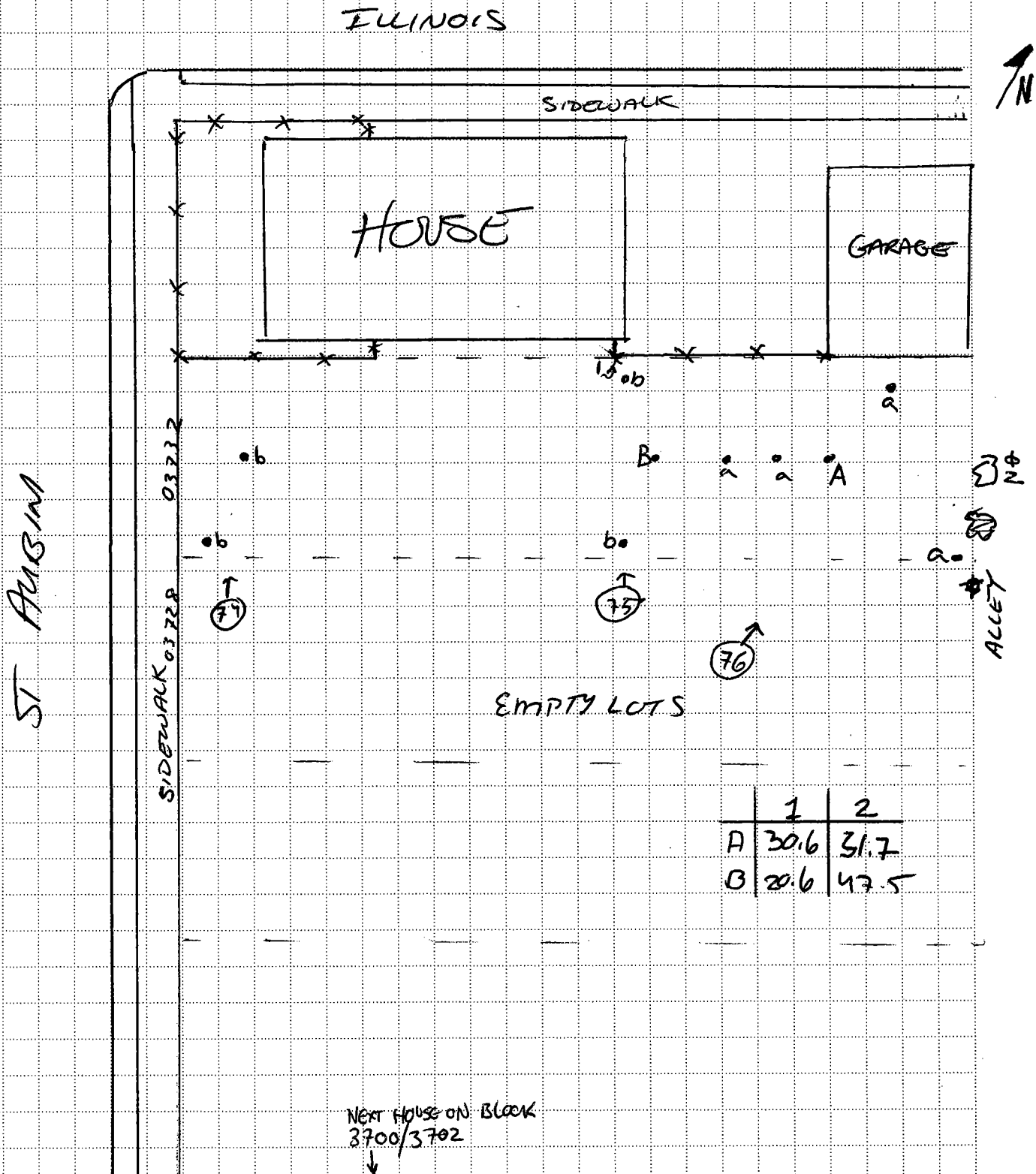
TASK DESCRIPTION STA-03732 A+B TASK NO. _____

PREPARED BY R. NEMIROVSKY DEPT _____ DATE 11/17/03

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY	
<div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>	
DEPT _____	DATE _____



Former Aetna Smelting – 1826 Illinois

701 Mack – Property located on the corner of Chrysler Dr and Mack. This is the southeast end of the Edward Tolan Playfield and it is directly northeast of Crockett Technical High School. The area between the slide and monkey bars, the area northeast of the baseball diamond, and the area southwest of the baseball diamond were used for the sampling areas.

Looking south and west, respectively, along the property at 5 total discrete sample A locations.



Looking northwest along the property at 5 total discrete sample B locations.



Illinois (cont'd)

701 Mack (cont'd)

Looking south along the property at 5 discrete sample C locations.



Looking west and northwest, respectively, along the property at 5 total discrete sample D locations.



Illinois (cont'd)

701 Mack (cont'd)

Looking south along the property at 5 discrete sample E locations.



Looking west along the property at 5 discrete sample F locations.



Illinois (cont'd)

701 Mack – Property located on the southwest side of Chrysler Dr. This is the area furthest to the northwest end of the Edward Tolan Playfield. The property was broken into the east, between east and west, and west ends for the sampling areas.

Looking north along the property at 5 discrete sample G locations.



Looking south along the property at 5 discrete sample H locations.



Illinois (cont'd)

701 Mack (cont'd)

Looking west along the property at 5 discrete sample I locations.



Looking south along the property at 5 discrete sample J locations.



Illinois (cont'd)

701 Mack (cont'd)

Looking north along the property at 5 discrete sample K locations.



Looking southeast along the property at 5 discrete sample L locations.



Illinois (cont'd)

2168 Illinois – Vacant property located on the southeast side of Illinois St and to the northeast of a house at 2162 Illinois.

Looking southeast along the vacant property at 5 discrete sample A locations, and 4 of 5 sample B locations further to the southeast in the back of the photo.



Looking northeast along the vacant property at 1 of 5 discrete sample B locations.



Illinois (cont'd)

1989 Illinois – Vacant property located on the northwest side of Illinois St and on the northeast side of a fence lined with scrubs and trees.

Looking southwest along the vacant property at 2 of 5 discrete sample A locations.



Looking west along the vacant property at 3 of 5 discrete sample A locations, and 5 discrete sample B locations located further west and to the back of the photo.



Illinois (cont'd)

3809 St Aubin – Vacant property located on the southwest side of St Aubin and directly northwest of an unpaved parking lot on the corner of St Aubin and Illinois.

Looking northeast and northwest, respectively, along the vacant property at 5 total discrete sample A locations.



Looking southwest along the vacant property at 5 discrete sample B locations.



Illinois (cont'd)

3701 St Aubin – Vacant property located on the corner of St Aubin and St Joseph.

Looking southeast along the vacant property at 5 discrete sample A locations.



Looking south along the vacant property at 5 discrete sample B locations.



Illinois (cont'd)

3719 St Aubin – Vacant property located on the southwest/west side of St Aubin and to the south of the Lumber & Millwork Company at 3741 St Aubin.

Looking north along the vacant property at 5 discrete sample A locations.



Looking west along the vacant property at 5 discrete sample B locations.



Illinois (cont'd)

3732 St Aubin – Vacant property located on the northeast side of St Aubin and directly southeast of a house.

Looking north along the vacant property at 5 discrete sample A locations.

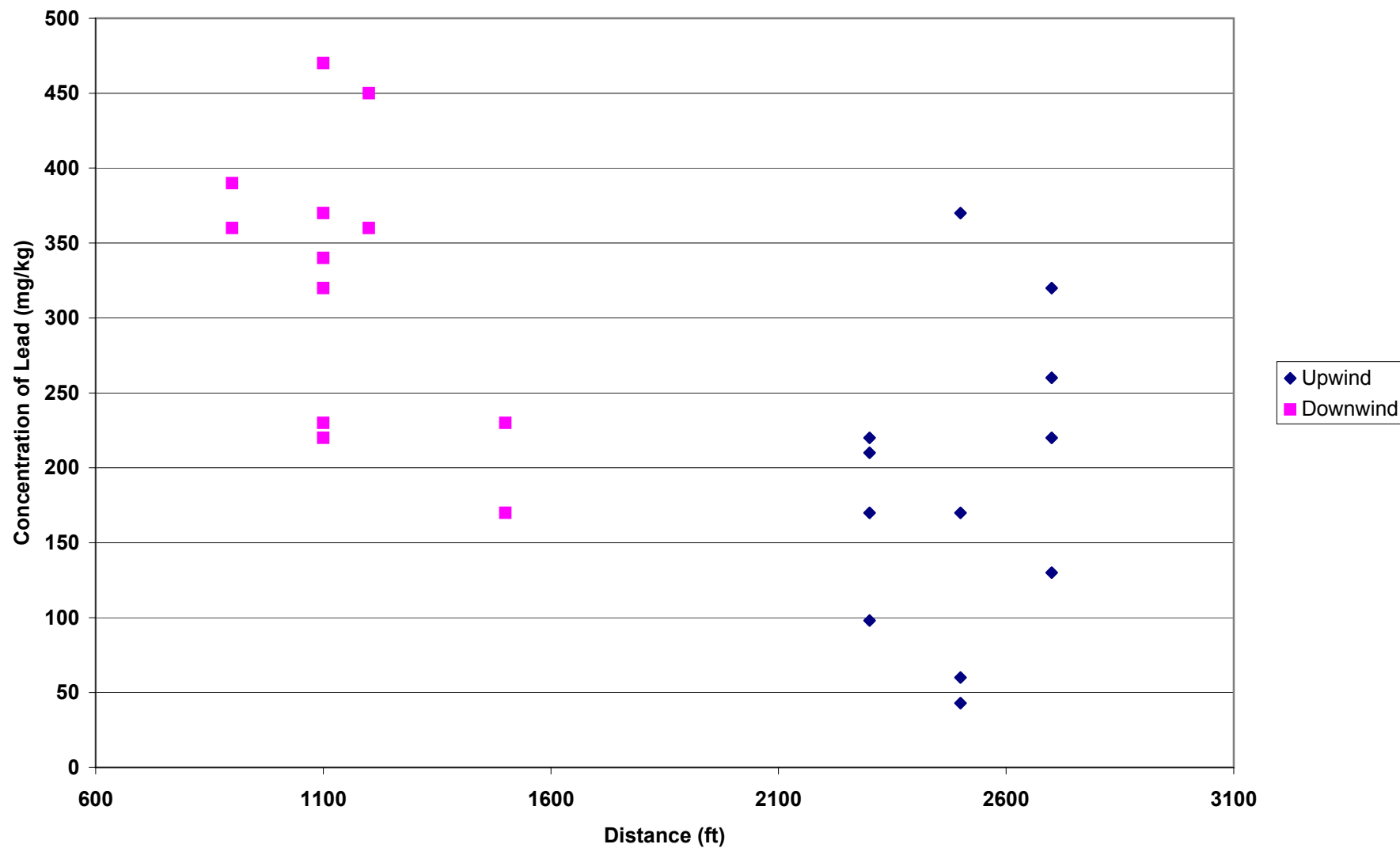


Looking northwest along the vacant property at 5 total sample B locations.



ATTACHMENT E
CONCENTRATION GRAPH

1826 Illinois



Aetna

*** Linear Model ***

Call: lm(formula = Lead.ppm ~ Location + Distance.ft + Distance.ft:Location, data = Aetna, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-146.3	-62.1	-0.641	48.11	180.8

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	-173.2500	410.3899	-0.4222	0.6774
Location	807.2244	445.2554	1.8129	0.0849
Distance.ft	0.1450	0.1638	0.8852	0.3866
Distance.ft:Location	-0.4129	0.2210	-1.8684	0.0764

Residual standard error: 92.66 on 20 degrees of freedom

Multiple R-Squared: 0.4606

F-statistic: 5.693 on 3 and 20 degrees of freedom, the p-value is 0.0055

Analysis of Variance Table

Response: Lead.ppm

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	111930.0	111930.0	13.03564	0.0017453
Distance.ft	1	4754.4	4754.4	0.55371	0.4654607
Distance.ft:Location	1	29974.3	29974.3	3.49087	0.0764284
Residuals	20	171729.3	8586.5		

*** Linear Model ***

Call: lm(formula = Log.Lead ~ Location + Distance.ft + Distance.ft:Location, data = Aetna, na.action = na.exclude)

Residuals:

Min	1Q	Median	3Q	Max
-1.319	-0.2831	0.0493	0.3449	0.8338

Coefficients:

	Value	Std. Error	t value	Pr(> t)
(Intercept)	3.3162	2.2665	1.4632	0.1590
Location	3.5686	2.4590	1.4512	0.1622
Distance.ft	0.0007	0.0009	0.7798	0.4447
Distance.ft:Location	-0.0017	0.0012	-1.3913	0.1794

Residual standard error: 0.5117 on 20 degrees of freedom

Multiple R-Squared: 0.3781

F-statistic: 4.052 on 3 and 20 degrees of freedom, the p-value is 0.02109

Analysis of Variance Table

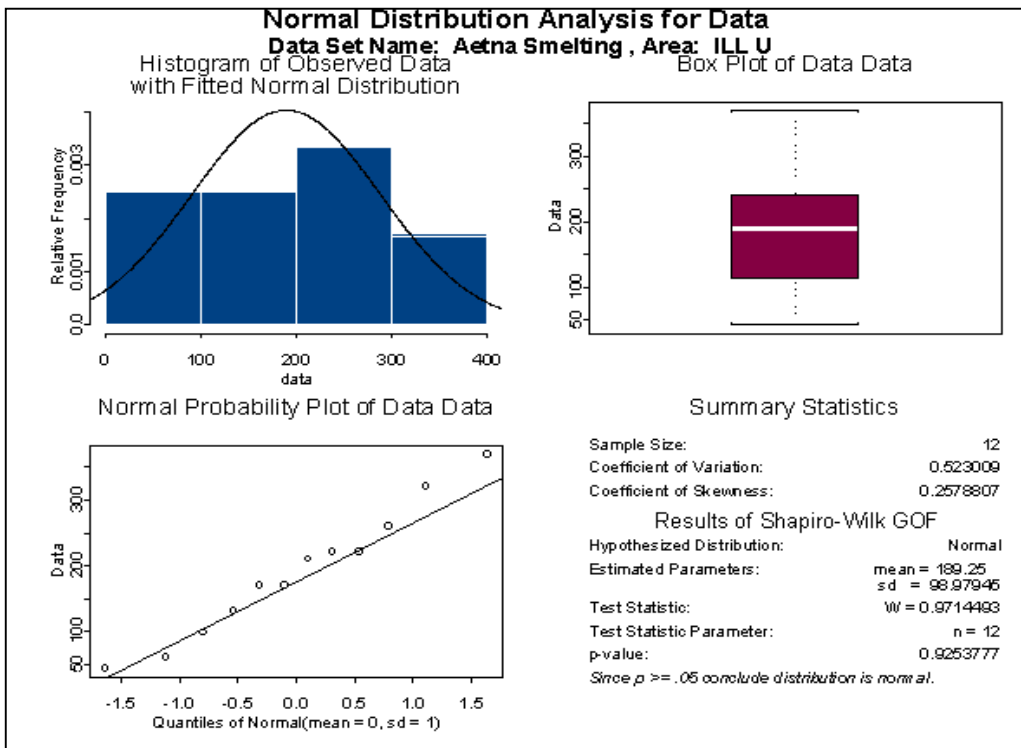
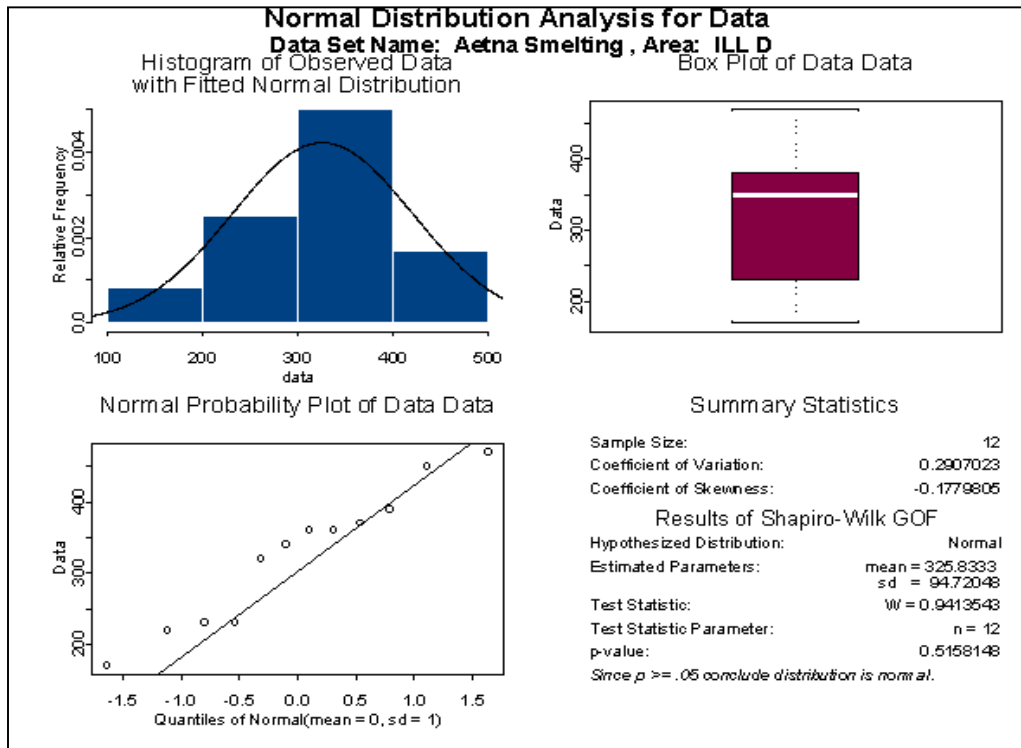
Response: Log.Lead

Terms added sequentially (first to last)

	Df	Sum of Sq	Mean Sq	F Value	Pr(F)
Location	1	2.640184	2.640184	10.08139	0.0047587
Distance.ft	1	0.036720	0.036720	0.14021	0.7120102
Distance.ft:Location	1	0.506932	0.506932	1.93569	0.1794214
Residuals	20	5.237739	0.261887		

ATTACHMENT F
STATISTICAL DISTRIBUTION

Aetna Smelting Statistical Distribution

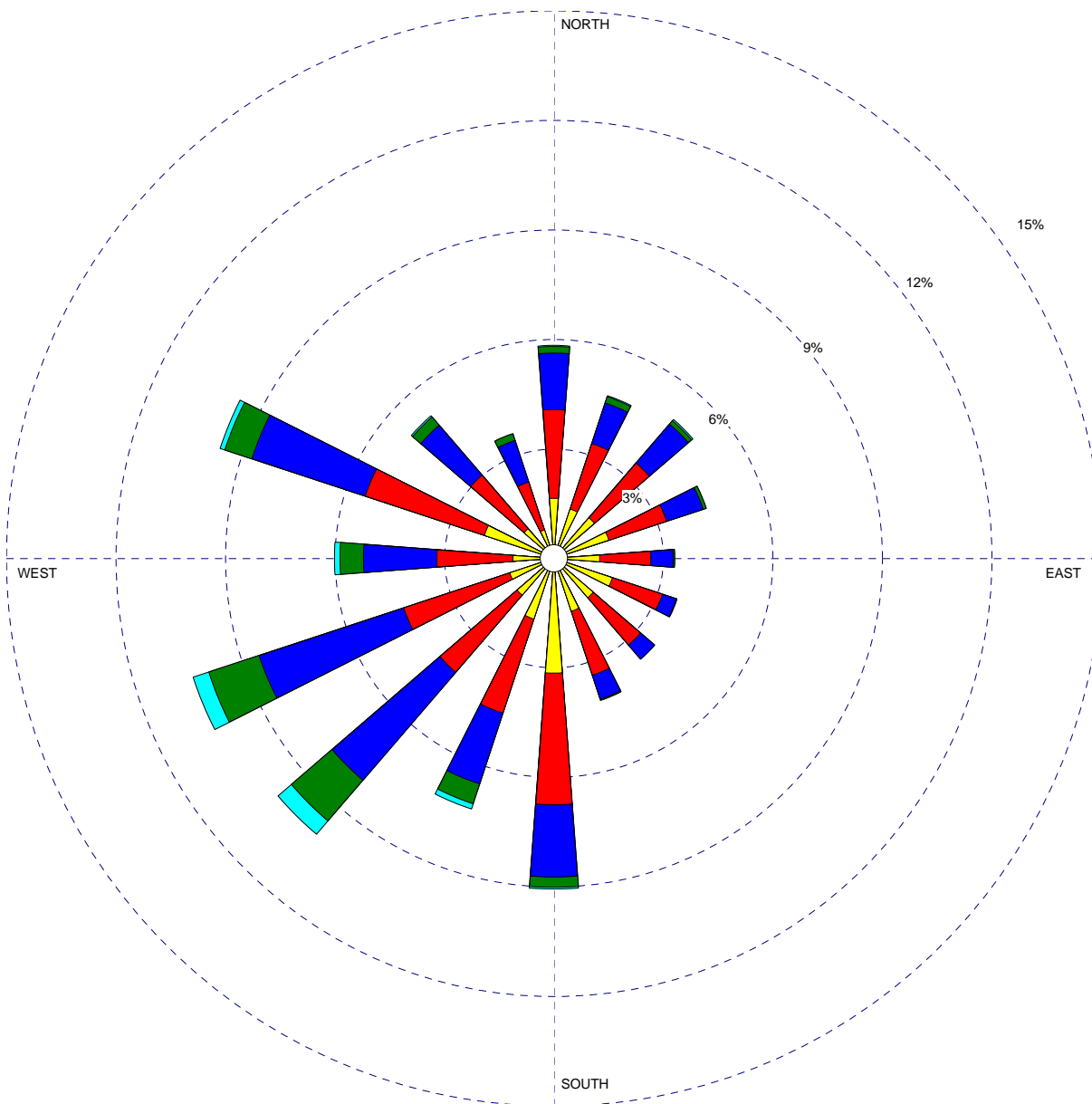


Appendix K

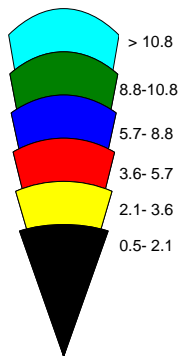
Wind Rose Plot

WIND ROSE PLOT

STATION #94847 - DETROIT/METROPOLITAN ARPT, MI



Wind Speed (m/s)



DISPLAY

Wind Speed

AVG. WIND SPEED

5.06 m/s

ORIENTATION

**Direction
(blowing from)**

DATE

2/3/2003

UNIT

m/s

CALM WINDS

3.67%

PLOT YEAR-DATE-TIME

**84 85 86 87 88 89 90 91
January 1 - December 31
Midnight - 11 PM**

Weston Solutions, Inc.

**Years
1984-1991**

ATTACHMENT C